



THE
SCIENTIFIC SYSTEM
OF MORALITY

BY

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PREFACE

THE following Essays are reprints of recent articles written by the Author, and published in various magazines. They are intended to show, in a concise form, that all, or nearly all, the phenomena of human conduct can be rationally explained by means of the chief principles of science without the help of unproved statements of any kind. The principles are the well-known ones of universal causation, universal motion, continuity of motion, etc., all of which are based upon reliable experiments.

The fundamental ideas pervading these Essays are: that all things, mankind included, are moved and governed by the incessant and indestructible motion which pervades all bodies and all space, and which acts according to invariable laws; that weaker powers are governed by stronger ones; and that men must submit to all powers

greater than their own. This motion is the basis of our conduct. We know nothing of its "first cause"; we cannot create it, but only accept it from bodies around us, and react upon them to an equivalent extent. It can also be stored up in our tissues, and liberated by acts of volition, much like the liberation of the stored-up energy of gunpowder by means of a spark.

The welfare of the universe takes precedence of all things. Thus, while we are usually only willing to work or to suffer in order to gain pleasure, we are incessantly compelled by universal energy, acting through our environments, to do that which is good for the cosmos, whether it is painful or pleasant to ourselves. That human pleasure, and even human life, is of infinitely smaller importance than the welfare of the universe, is proved by the fact that the lives of multitudes of human beings are sacrificed annually by great terrestrial catastrophes and influences, and by a host of diseases, insanity, accidents, etc., which we cannot avoid or prevent. Owing to our extreme weakness in comparison with the immense power of nature, we are

compelled to endure all "the ills of life"; and in consequence of our very limited knowledge we are led to believe a multitude of errors and to suffer great pain and misery through our mistakes. The true scientific explanation of the immense amount of untruth, error, pain, and misery around us, and of the "great mystery of sin and evil," is the fact that surrounding bodies are compelled to act upon and influence us as they do in consequence of their natural properties and of our own. Thus fire must burn us, and frost must freeze us, whether we are willing or not.

Numberless impressions are made by our environments upon our nervous system every instant; but the great majority of them are so feeble that we do not notice them. Nevertheless, many are sufficiently strong and permanent to subsequently liberate stored-up energy in our tissues, and produce dreams, thoughts, and actions; and in this way they largely govern our conduct and form our character without our noticing it. Many of these feeble impressions, both true and false ones, become stronger, and are indelibly fixed in our brains by automatic

repetition. These cerebral impressions vary in truthfulness with the width of our knowledge, and the great majority of them are largely untrue, because they are not corrected by intellect or by sufficient knowledge of the universality of natural causation.

These very wide statements are so far in advance of ordinary ideas that they appear to some persons heresy or a new revelation; but copious evidence supporting them is contained in a larger book on *The Scientific Basis of Morality* (Sonnenschein; 1899).

As the Essays constitute a New Scientific System of Morality, it is hoped that these very condensed remarks will assist the reader in understanding them, and that they will be seriously studied by the spiritual guides of mankind.

I.

HOW UNIVERSAL ENERGY GOVERNS MANKIND¹

It is well known that we continually gain and lose energy; that the body of every living human being is always permeated throughout by energy in the form of chemical action, heat, and visible motion, which cannot be entirely suppressed except by death, or diminished except by sleep, etc. Further, that a species of combustion or chemical union is constantly going on throughout the whole of our structure, between the air we breathe and the blood and tissues of our body, and that this action produces heat and energy, which maintain our temperature and movement. It is also known that we possess two sets of nerves, the "ingoining" and "outgoing"²—one to convey impulses *to* each nerve-centre, and the other *from* it; that some of the energy from all parts of our body is transmitted by the *ingoining* nerves to different

¹ From the *Literary Guide*, November 1st, 1902.

² "Sensory" and "motor."

parts of the brain and to the nervous masses termed "ganglia" in various parts of our system, and that in obedience to this power the brain excites ideas and the brain and ganglia retransmit energy by "reflex action" through the *outgoing* nerves to all the various organs, tissues, and muscles, and determine their actions; and thus the energy governs and regulates our thoughts, movements, growth, and decay. Further, that less heat or energy is produced and transmitted during sleep than during the waking state, and that a greater amount of such power requires more food to produce it.

In addition to this government of us by the natural energy *within* us, there is that by the energies and stimuli *outside* us, which act through our senses and *ingoin*g nerves upon the brain and ganglia and cause "reflex" impulses to be transmitted through the *outgoing* nerves to all organs and tissues, and thus simultaneously help to cause and govern our physical and mental actions in a similar manner. Human energy is greater in summer than in winter, and without energy from the sun all mankind would perish.

In these ways the natural energies within and around us co-operate to govern and

regulate our bodies and minds through the medium of our nervous system.

The ordinary unscientific view is that we "govern ourselves" by means of "the will"; but the real truth is, even our volitional ideas or determinations are originated by the energy of the *ingoin*g nerve-currents from within and without, and by that caused by cerebral oxidation, much in the same way as ideas are produced in our dreams; and it is well known that we cannot "govern ourselves" properly or morally unless we possess the requisite ideas or knowledge, and are influenced by suitable training and environment. We fancy that we "govern ourselves" because the effects follow so certainly our volitional ideas; but they follow our ideas whether volitional or not. Man proposes and Energy disposes: we *must* think and move whether we are "willing" or not.

Abundant evidence exists of the truth of all the foregoing statements; but it requires much labour to collect it.

If we attempt to trace the phenomena farther back towards "first causes," we only arrive at an endless succession of natural sequences (see *The Scientific Basis of Morality*, 1899, chapter xlii.), and this agrees with the great

scientific belief that energy cannot either be created or destroyed, but can only be changed from one form to another, and that each mass of matter is a collection of incessant molecular motions.

The most recent scientific evidence bearing upon the subject is that afforded by the experimental researches of Professor Boze, on *Response in the Living and Non-living* (Longmans, 1902), which "show that the effects of fatigue, stimulants, depressants, and poisons are alike in the organic and inorganic, and demonstrate that the response phenomena in the living have been foreshadowed in the non-living."

II.

HOW THE WORLD IS GOVERNED¹

A CONCISE SCIENTIFIC VIEW

THE real nature of the government of the world, and of mankind in particular, has been a question of absorbing interest during many ages, but in consequence of the great magnitude of the subject, the complexity of the evidence, and especially of its having been mixed up with supernaturalism, the public mind has not arrived at a state of clearness respecting it. At the present time, however, the accumulated proofs of its being in accordance with all the great principles of science, and especially with those of universal causation and universal energy, are bringing it near to a definite conclusion which many intelligent persons will be able to understand.

The chief ideas of the theory of Government here presented are that the real controlling agent is the ceaseless indestructible motion or energy of the molecules and masses of matter distributed throughout space, and that these

¹ From the *Empire Review*, February, 1903.

motions are termed heat, light, electricity, magnetism, and chemical power ; that they are incessantly being changed into each other, and transferred from one body to another by means of the universal ether which pervades all bodies and all space, and that it is this energy which really moves and governs the human body and brain, and causes all their actions, both physical and mental ; that, as each different substance has a more or less different set of properties, it influences every other substance in a somewhat different manner, and that it is in consequence of these movements and of their being continually transferred from one body to another, and often transmuted in the process, that nearly all natural effects are produced.

In a certain sense, every body more or less governs every other body, because all have some degree of influence upon all others, as we see in the phenomena of gravitation. But "nothing comes from nothing," and we know very little about the "absolute," the "infinite," the "first cause," of anything, or about the "creation" of matter or energy except by inference. All matter appears to require previous matter, and all energy seems to need prior energy to produce it. Matter

seems to be never destroyed, but only transmuted ; and if it is never destroyed, the government of the universe is a never-ending process. The results of some experiments, however, recently made *appear* in an extremely minute degree to limit this conclusion. The whole of these statements are supported by abundance of scientific evidence. The subject of terrestrial government belongs to natural science, because it is entirely based upon the movements of material bodies. The hypothesis that all natural phenomena are in some way due to motion was suggested long ago, but the evidence then existing in support of it was very much less than now. "All our knowledge of the world is nothing more than a knowledge of motion"—(Romanes).

According to the theory of universal radiation now being rapidly established, rays of energy proceed incessantly from all bodies to all bodies, and more or less influence and govern them. In many of these cases the receiving bodies absorb and store up some of the energy they receive, and give it out again under suitable conditions ; the heat of the sun stored up in coal is a familiar example. In other cases a reaction occurs between the two bodies ; and the "action and reaction are equal

and opposite"; as in the attractions of magnets and in cases of chemical union. The human body stores up some of the energy of food during periods of rest, and gives it out again during hours of work and times of excitement; and in consequence of the sudden exhibition of power without an apparent cause in various cases, many persons have been led to believe that energy may be created, and that an effect may arise without a natural cause; but no satisfactory proof of this belief has ever been given. On the other hand, the results of numerous experimental researches have firmly established the principles of equivalence and conservation of energy in cases of cause and effect.

Man's "environments," internal and external, incessantly act upon his body and brain, and he reacts upon them; but in consequence of his extremely limited powers he can only act upon the outer world to a very small extent: the feebleness of his powers is proved by his numerous failures. He can no more resist universal energy than the grains of sand on the seashore can resist the mighty roll of the ocean. He can only endure a very limited range of temperature; a sudden outburst of great heat on the sun could as easily destroy

all human life on this globe as a man could extinguish the flame of a candle. His extreme feebleness of resistance has been recently shown in the case of volcanic eruptions in the West Indies.

Compulsion and motion reign everywhere. Governed by omnipotent energy, men are "like clay in the hands of the potter"; they are compelled to be born, to live, and to die. Man cannot cease moving until he dies; he is "fixed like a plant on his peculiar spot: to draw nutrition, propagate, and rot"—(Pope). He is carried through space upon this globe at an immense velocity without his feeling it, and whether he is willing or not. In common with all bodies whatever, he is compelled to act in certain ways, and to abstain from acting in certain others; he "is as free as a bird in a cage." In falling from a height he is no more free than a stone. He is often compelled by deceptive appearances to accept untruths and believe them as truths; thus, at one time he was obliged to believe that the earth was a plane and a fixed body in space, and he is still in a similar predicament with regard to some theological dogmas.

As mechanical "action and reaction are equal and opposite," when a man whose

weight is 112 pounds makes a leap 6 feet in height, he only pushes the earth in the opposite direction about a 1,666,000,000 million millionth part of an inch. The energy of inanimate nature is almost infinitely greater than his own, and he can only increase his power over it by the help of increased knowledge. He could not traverse the ocean until he discovered the mariner's compass, and knew how to use it. He absorbs energy and gives it out again, and a continual stream of it passes through him and through all other bodies, whether living or dead. The utmost he can do in life is either to adapt himself to circumstances or avoid them, and he can only do this provided there exists sufficient cause or motive, such as knowledge, to move him, so that even in this case he does not act without a natural cause. Ignorance of science often makes him blind to the real causes which move him; he thinks that it is a mysterious "spirit" within him which determines his acts, because he fails to detect the natural causes of his volitions. Do whatever he may, or talk however much, he is really confronted at every step by a sufficient cause, or causes, to rationally account for all his thoughts and actions.

The chief method employed in governing the universe is might; weaker powers are compelled to yield to stronger ones everywhere; the head governing power is the strongest one, and universal energy governs all things. The sun governs the planets and all living bodies upon them; it governs the earth, and the earth governs us. In the government of nations by nations, and of man by man, the same method prevails; thus the greater the energy, influence, wisdom, knowledge, or money, a man possesses, the greater, usually, is his governing power, and—"He shall take who has the power, and he shall keep who can." In nearly all cases, also, "right" is primarily or essentially decided by might; a volcano or a flood shows no mercy to men, and does not ask their permission before it destroys them. In all great terrestrial disasters to mankind, such as earthquakes, avalanches, tidal-waves, inundations, blizzards, droughts, famines, pestilences, might prevails over what we call "right," and we are compelled by this fact to conclude that man is not the most important entity in nature, and that the government of the world is essentially determined by the strongest power.

Government implies restraint of the weaker

by the stronger, and neither dead nor living things can be governed without it ; it holds good even with married persons.

I find no hint throughout the universe
Of good or ill, of blessings or of curse ;
I find alone necessity supreme.

—*Thomson, "The City of Dreadful Night."*

All bodies whatever, living or dead, are governed through their properties ; the great globes in space, the mountains, rocks, seas, rivers, and inanimate bodies generally, are controlled chiefly through the property of gravitation. Bodies possessing consciousness, and especially the more complex class of animals and man, are governed largely by means of feeling and desire, pleasure and pain ; men govern each other chiefly through the pleasure they can confer and the pain they can inflict upon each other ; they govern through the property of consciousness.

Wherever there is consciousness there is perception of bodily state, and when sensation ceases pain and pleasure cease. Pleasure is closely associated with freedom, and pain with restraint ; wherever there is pain there is restraint of motion and thought. Restraint in animals produces more or less pain or discomfort, and this by reflex action excites

resistance in them to being governed unless they have been properly trained : " Spare the rod and spoil the child." Too much or too little pain or pleasure, and too much or too little conflict or competition, disturb good government. Men cannot be governed by pure truth alone, because they cannot sufficiently understand it, and because it is often too unpleasant for them to bear. Wherever there is too much freedom untrained persons often abuse it, and where there is restraint they too readily cry out ; they resist reasonable restraint, and complain without sufficient reason of the unavoidable trials of life.

The whole population of this globe, numbering more than 1,200 millions, and including the rich as well as the poor, are constantly in motion, pleasurable or painful, struggling to keep themselves alive. According to the great theory of ceaseless motion, we all live on sufferance by infinite power, acting according to unyielding laws ; but we also live in agreement with the lesser principle of action and re-action, and frequently behave like " bluebottle " flies which dash against windows —*i.e.*, we ignorantly resist omnipotent government until we find the narrow limits of our powers, and then repent too late. In accor-

dance with the same principle of action and re-action arise the frequent conflicts between nations, between man and man, and generally between men and all greater powers. Animals, plants, and mineral masses, also govern each other by "action and reaction"; even blades of grass kill each other in their contest for air and light. "War of the elements," like war among men, is essentially violent conflict of masses, accompanied usually by sudden liberation of stored-up power; but it does not, so far as we know, occur in any case without adequate natural cause. Among men war is sometimes occasioned in order to produce improvements in the mode of legislative government, as is said to have been the case in the recent South African war. Perfect absence of conflict is death.

We all shrink from pain, and multitudes of persons of narrow ideas seem to think that the wide-spread existence of pain and misery among mankind proves that the world is not properly managed. But it may be safely affirmed that life entirely without pain is impossible; that a large measure of pain is at present unavoidable, and that pain is really necessary to human life and welfare in a multitude of ways. Pleasure and pain are

caused by the same powers and governed by the same conditions as health and disease. While pain governs partly by prospect of punishment, pleasure governs partly by hope of reward; both pain and pleasure compel men to act rightly towards their fellow creatures. Pain always means something, and compels us to seek the knowledge necessary to remove or prevent it. It often warns us of danger, and if it was not for pain and the anticipation of it, we should injure or kill ourselves in many ways; insensibility to it is dangerous, and has been a cause of numerous accidents. "Sweet are the uses of adversity" —(Shakespeare). "If adversity hath killed its thousands, prosperity hath killed its tens of thousands."

Probably the greatest cause of pain and resistance to good government is ignorance, and is commonly found in a high degree among miners and the lowest class of workmen: the largest proportion of criminals to population in this country occurs in the South Wales coal district. Untrained men often unintentionally inflict great pain upon their fellow-men by carelessness and errors, causing accidents, explosions in mines, fires in buildings, etc., and produce widespread

misery by their unwise conduct. They are the most difficult to govern, and in some cases they maliciously boycott and terrorise their innocent neighbours, and wilfully combine in various ways, both in Parliament and out of it, to render just government impossible. Untrained persons often require strong stimulants to make them improve and resist until natural energy in the form of adversity and hunger supplies them. Universal energy, acting through human invention of new machinery and other contrivances, occasionally throws large numbers of such persons out of employment, and compels them to adapt themselves to the changes: they must either alter or starve.

All kinds of animals, men included, torture, kill, and eat each other; the land, sea, and air are one vast shambles; kill or be killed, and eat or be eaten, are great facts in nature. However much we may recoil from the idea, this widespread production of pain is necessary, unavoidable, and therefore justifiable, for if living creatures of nearly all kinds were not continually being killed in vast numbers, by the means already mentioned, they would multiply so rapidly that the entire land would quickly become covered with them, the seas

would be filled with one vast mass of fish, and the air with birds and insects. In the government of this world, human life is of vastly less importance than the integrity of the earth's crust upon which all animal life depends. Volcanoes and earthquakes are necessary to the safety of the terrestrial structure by relieving pent-up energy—*i.e.*, they act as safety-valves and prevent greater explosions, pain, and destruction. There exists plenty of evidence to prove the truth of all these statements about pain and conflict, and that the world is compulsorily governed as regards animal life; and it is not possible to prove that it is not properly governed. It is in consequence of our very limited power of bearing pain, and the extreme narrowness of our ideas, that we view unavoidable pain and misery as "evil," and are continually dissatisfied with our lot in life; but if we were not at all discontented, we, in many cases, would not improve, so that even our dissatisfaction is not entirely "evil."

Dissatisfaction is a matter of degree; there is rational and irrational discontent. So far from a reasonable degree of it being an "evil," and making us miserable with the necessary conditions of life, it is one of the chief motives

of improvement. It induces us to discover new knowledge, to invent new contrivances, to apply them to new purposes, to extend them on a large scale for the purpose of accumulating money and power, and consequently benefits mankind. It is also an important element in the self-government of individuals and of nations. Before a man can personally improve he must have a motive or cause, he must perceive his own defects ; and similarly with a nation, which is only a collection of individuals, it must first recognise its own shortcomings before it can proceed to remove them.

Many untrained men and women are compelled by ignorance and the exigencies of life to largely ignore self-government, and attempt to get through life without it. Being very much occupied in getting money and pleasure, they leave no time for acquiring the knowledge of their own bodies necessary for preserving their lives ; they prematurely "walk straight into their graves." This is one of the various ways in which the human population of the earth is controlled. That the government of the world and mankind is in accordance with, and is represented by, a perfect system of truth, is now acknowledged

by scientific men of all shades of opinion; but there are multitudes of unscientific persons who still think that it is partly influenced by "spirits" and supernatural influences. By the term "truth" is here meant perfect consistency with all known facts—*i.e.*, every truth really agrees with every other truth; and by "universal truth" is meant universal consistency.

The most ready way of arriving at universal truth is to explain all things by means of a preconceived theory which agrees with all known facts, and the only one which does so in the present subject is that of universal causation and universal motion. A chief objection to this theory is, that it would require unlimited time and infinite knowledge to "absolutely" prove it; and as human life and all human powers are exceedingly limited, and we are unable either to obtain or comprehend the necessary infinite evidence, we shall never be able to "absolutely" prove it.

This objection is a true one, but, thanks to logical inference and rational argument, it does not prevent our arriving at a satisfactory conclusion in the matter. Thus, among all the millions of millions of experiments and experiences of scientific men and others, not a

single phenomenon or effect has ever been clearly proved to have arisen without a natural cause; and as all existing evidence is so far in support of the theory, and there appears to be no clear evidence against it, we are rationally compelled to believe it. We would indeed be in a sad plight if we could not believe or act in any matter until we possessed infinite and absolute knowledge respecting it. As my sole object is to arrive at truth by a strictly rational method, it is a matter of comparative indifference to me whether a naturalistic or a supernaturalistic view of the universe is the true one.

Although Kant had not the great amount of scientific evidence which we possess respecting the complete dependence of human thought and action upon natural causes, he had a clear conception of it as an hypothesis; thus he is reported to have said :—

If it were possible to penetrate sufficiently deeply into the manner of thinking of each man, and if the most insignificant springs and all the circumstances influencing a man were known, one could calculate exactly his manner of action in the future, just as one calculates an eclipse of the sun or the moon.

But even if he had possessed the present great mass of evidence in support of his conclusion, he would not have been able to enforce it,

because of the unpreparedness of the public mind to understand and receive it.

One great obstacle to belief in universal natural causation lies, not in deficiency of proof, but in lack of scientific knowledge by the public ; another is the immovable nature of strong cerebral impressions, commonly called "preconceived opinions"; a third is the very common desire to believe only that which is pleasant or easily understood ; and another is the irrational demand for "absolute proof," and to be told the "first causes" or "origin" of things, each of which lies entirely beyond all human power. There is, however, rational scepticism and irrational doubt, and those who are not convinced by a degree of probability of millions of millions of proofs to none at all, or prefer ignorance to knowledge, may be considered to be so far irrational. Belief without evidence, and unbelief in the presence of sufficient proof, often amounts to mental disease. A person who does not believe in the universality of natural causation because the evidence in support of it is not infinite and absolute, cannot consistently believe that he will die, or that the sun will rise to-morrow ; he must, as John Locke said, "sit still and perish." Those who want

"absolute" knowledge may be recommended to discover some if they can.

Bearing in mind the very limited extent of our knowledge, and that "probability is the very guide of life," the practical question for mankind is, not whether we can "absolutely" prove the universality of natural causation, or what are the "first causes" or "origin" of things, but whether its degree of likelihood is so vast that we may safely disregard the absence of infinite evidence and "absolute" proof which we cannot comprehend, and which we are compelled to dispense with in nearly all cases. This question, however, is already settled by the facts that we have no choice in the matter, and that all men, even the most extreme supernaturalists and disbelievers in science, are compelled to act in practical life when they conclude that the degree of probability in favour of their acting is sufficient.

We cannot reasonably expect that the real agreement between the theory of universal natural causation and universal truth will ever be manifest to all unscientific persons; first, because it exceeds their comprehension; and second, because there are many *seeming* contradictions in science. Thus a balloon

risers in the air and *seems* to contradict the theory of universal gravitation. The sun *appears* to revolve round the earth, and it took a great many years to entirely dispel this false idea. Nearly all the seeming objections of importance to the theory of universal natural causation have, however, now been either explained or disproved, though not so as to convince some supernaturalists, who have fixed ideas.

Flattering false beliefs have a long existence; thus, notwithstanding that the evidence in support of universal natural causation is so vast, there are multitudes of persons who still deny the truth of it in particular cases. One form of denial of it is the belief in "miracles" and "supernatural events," another is "freedom of the will," and a third is "divine interference." This disbelief is declining, but the decline is only very gradual, largely because strong cerebral impressions are only obliterated by death, and partly because of the slow acceptance of fundamental scientific knowledge by the public. By a "miracle" or a "supernatural event," I mean a something which occurs without a natural cause. Another cause of the slow acceptance of the theory is, that it is greatly opposed to

some of our most cherished hopes and desires. Belief in "divine interposition," a "heaven," and "everlasting happiness," has been, and is, a great consolation to afflicted and unscientific persons ; but that is no proof of its truth, nor disproof of the natural theory. It is probably better for mankind that fallacious comforting beliefs are not more rapidly destroyed than they are, because they act as useful retarders of the speed of human progress : mankind are too weak to bear more rapid changes.

According to the theory of universal causation, we all do as we must under all the conditions and circumstances of the case. This is not, however, as many persons suppose, "fatalism," because fatalism means that we do as we are compelled entirely independent of all conditions and circumstances. We are not entirely governed by rose-water and argument. Compulsion governs mankind ; all living things are controlled by the actions and reactions continually occurring between them and their environment, and between the different parts of their own structures. The lower human faculties—*i.e.*, the animal feelings and desires, directly govern the higher ones—*viz.*, the intellect and reason ; and the

higher ones govern the lower by reflex action and by means of training. Men are governed primarily by their animal wants and passions, and secondarily by their knowledge and wisdom; and their animal wants are caused by natural energies within and around them.

The obscure phenomenon of volition is still believed by many religious persons to be an exception in certain cases to universal natural causation, and some conspicuous theologians have affirmed that "the will is a supernatural power . . . independent of natural law"; "an original uncaused cause"; "the one and only force . . . which takes cognisance of principles and is capable of acting." But the more we examine it with the help of comprehensive scientific knowledge, the more its natural origin becomes evident, so that, if we had infinite time and unlimited knowledge, we could "absolutely" prove it. By an "act of will" I mean a determination to effect an object already in the mind.

The obscurity of an act of will is due to several causes. One is that we, like all other bodies, dead or living, are unable to perform two contradictory acts at the same time. Thus, we cannot observe one idea while we are intently thinking of another; our consciousness

cannot observe itself; we cannot contemplate our volitional ideas until after they have been formed. Another is that in certain cases great causes seem to produce only small effects, because some of the energy is absorbed and stored up in a potential state; while in other cases "great effects from small causes spring," because the potential energy is suddenly liberated. Thus a small spark explodes the largest mass of gunpowder, and an unobserved volitional idea excites the strongest act of heroism; and hence a powerful effect *seems* to arise without an adequate cause, or without any cause at all. A conjurer takes advantage of our inability to notice one thing while we are noticing another, by attracting our attention from what he wishes us not to see to that which he desires us to see, so that he may deceive us without being detected. Similar misleading phenomena occur in nature. Thus, a stick thrust obliquely into water appears to be bent; gold, being a conspicuous substance, was discovered thousands of years ago; while oxygen, notwithstanding that it was present everywhere and we could not exist without it, has, in consequence of its being an invisible gas, only been known to us about two hundred years.

Our mental powers are feeble; not unfrequently we are "conscious" of things which do not exist, while in other cases we are not conscious of some which do exist: there are multitudes of heavenly bodies which we cannot see, and which photography alone reveals to us. Being always with ourselves, we are nearly always thinking about ourselves, and thus we are led to believe the fallacy that we and this world are the most important of all things; ignoring the fact that there exist countless millions of other worlds of greater magnitude, energy, and governing power than our own, all governing each other and being governed by universal energy. Considering our extremely limited mental power, and the almost infinite complexity of natural phenomena, it is not very surprising that we believe many fallacies to be truth. The more comprehensively, however, the phenomena of nature are studied, the clearer does it appear that all things are governed as systematically as possible under all the conditions and circumstances.

III.

THE COMING SCIENTIFIC MORALITY¹

THE object of the following article is to show in a concise form the real origin of morality—the dependence of morality upon fundamental scientific principles, and the relation of science to good and evil. It proposes no revolutionary ideas, but illustrates the gradually coming effects of scientific knowledge upon the moral sentiments and conduct of mankind. The subject is treated in a comprehensive manner, because the ordinary treatment of morality introduces numerous contradictions.

(a) THE REAL FOUNDATION OF MORALITY.

The subjects of science and morality appear so very unlike that it is commonly believed they have no connection with each other. A chief reason for this is, morality is so very much more complex than mechanics, with which it is usually compared, that we cannot so readily understand it. If we examine books on morals, we find that, notwithstanding human bodies and brains are material

¹ From the *Westminster Review*, April, 1904.

substances constantly influenced by numerous scientific conditions, little or nothing is said in them about any scientific relations of the subject. As this fundamental omission requires notice, I beg leave to say a few words on the question; but, owing to its inherent complexity and its numerous seeming contradictions, it is impossible to make it clear to all persons, and, as inherent qualities are permanent, the only remedy for this is a prepared mind and attentive reading.

Notwithstanding the seeming absence of any connection between science and morality, I will endeavour to show that the chief principles of science are the great guides of life, and are not only essentially related to morality, but actually constitute its primary foundation. On the authority of sufficient evidence I venture to affirm that the only permanent basis of morality is immutable truth, and, as well-verified science is the most perfect truth we possess, we may reasonably expect to find a fixed basis of morality in it.

By the term "science" I mean knowledge derived from proper and sufficient evidence; by "morality" I mean such human conduct as produces justifiable effects on sentient creatures; by "immorality" the infliction of

unjustifiable injury upon living beings, and by "truth" I mean statements consistent with all known facts. The terms "truth" and "science" are largely synonymous, and, as science and dogma are incompatible, there is no dogmatic science; dogma is not knowledge. Although our knowledge of science is not yet to any large extent absolute, it is gradually becoming so, and is even now very certain in some of its parts. Thus we know to a second of time the periods of coming eclipses, and he who cannot believe that the sun will rise to-morrow because it is not "absolute knowledge" must "sit still and perish." Knowledge and belief are very different; by means of proper and sufficient evidence we may be gradually led to know all things, while without evidence we may believe, but cannot *know* anything. The most moral course is to proportion our faith and belief to the evidence.

As natural agents, such as alcohol and our environments, influence our moral conduct, and pain and pleasure are states of the nervous system, morality is a part of science. According to all related evidence, the permanent basis of morality lies in the great principles of universal motion, universal causation,

continuity of cause and effect, action and reaction, etc., all of which have been abundantly established by original research. With these truthful principles to guide us, all logical thinking on the subject leads to truth.

As all material phenomena, manifestly those of astronomy and physics, constitute a perfect and orderly system, a correct verbal representation of them must be a perfect system of truth; and as universal causation and motion present a similar system, I venture to say that they are a safer foundation for morality than any unprovable statements can possibly be. They are also more reliable guides of conduct than instinct or feeling alone, because moral conduct is a result of feeling after it has been corrected by intellect and training. In the very complex subject of morality, unless we know what is right, we often cannot do it; and even if we do know, we often act wrongly, simply because the stronger powers of feeling and desire compel us. Perfect integrity requires ability.

(b) DEPENDENCE OF MORALITY UPON UNIVERSAL MOTION.

Unceasing internal motion exists in all material bodies (including human beings),

and in the universal ether which pervades all substances and all space. We know nothing of the first cause of it, but we know that it is practically indestructible, that when it disappears it either becomes stored up or reappears in another form or place, and that it is continually being transferred from one body to another by radiation through the ether. The chief proofs of this are the phenomena of conservation of energy and of universal change. We know that this motion differs in form in every different substance, because each substance produces a different spectrum ; and we consider that these differences of form of motion are the cause of the unlike properties of different bodies, because when we confer new movements upon a body it acquires new properties. Thus a straight chain acquires rigidity when caused to move rapidly in the direction of its length ; the gyroscope and Foucault's pendulum are other examples. We know further that bodies of unlike properties act frequently and spontaneously upon each other by mere contact ; chemistry furnishes us with an immense number of such instances. They also act by radiation through the ether. Thus their spectra, such as those of the sun and of white-hot

coke, produce different effects upon a photographic surface, etc.; a mere look also may cause hatred.

All material substances are extremely complex, and we can only faintly realise the great feebleness of our perceptive powers in relation to them and their movements. The extremely minute molecular motions of the simplest substance entirely surpass our powers of perception and comprehension; spectrum analysis has shown that the internal movements of the smallest particle of white-hot iron "are more complex than the visible ones of the entire solar system."

Evidence already existing is abundantly sufficient to prove that all bodies (including ourselves) are not only in a state of constant internal motion, but also of continual change of motion; that the cause of this change is largely the unlike properties of different bodies, which enable them to act and react upon, and alter, the properties and motions of each other, as we see so often in cases of chemical union, etc.; and that all actions, including those of ourselves, occur in accordance with law. Such great truths as these are of the utmost value to mankind, but are not readily accepted, largely because ordinary

minds are not sufficiently scientific to receive them. As an example of this, about 300 years ago the English philosopher, Hobbes, said: "There is only one reality in the world; it is movement, eternal, without beginning, the cause of each and every change." Partly owing to the limited evidence existing at the time in proof of this hypothesis, his idea was neglected; but the evidence in its support has now become so vast that we are compelled to adopt it as a settled truth.

This universal motion in our organs and environments causes our experiences; our experiences and inferences from them produce our ideas; and our experiences and our ideas cause our actions through the medium of our nervous system. When our environments act upon our nervous centres the latter, by unconscious "reflex" or "automatic" action through the nerves, largely cause our bodily movements and the changes in our organs. Nearly every organ in our body acts automatically during sleep, and more or less during the waking state; the heart acts automatically at all times, the lungs breathe automatically, the brain thinks automatically during dreams, and partly so during the waking state; we walk automatically until we

come to a difficulty, and then the conscious intellect, excited by the stronger impression, operates and prevents an accident. Most of the actions, especially of untrained persons, are automatic. When we cease to automatically move we die. Automatic actions have no moral quality, because they do not involve conscious intellect.

In nearly all cases of physical and chemical action there are conversions of energy from one form into another, and in all such cases practically no energy is created or destroyed, the total effect being equal to the total cause. This is well known as the principle of universal equivalence and conservation of energy. Similar conversions take place in us; thus the latent energy contained in food and air gives rise to vital power. Nearly every such act, whether in living things or in dead ones, is, however, attended by dissipation of energy, usually in the form of heat; thus muscular energy warms our bodies, and thinking makes the head hot, and the dissipation of power in a steam engine and boiler between the furnace and fly-wheel is quite eighty-seven per cent. Through similar dissipations of energy within us our "reflex" actions are often weaker than our direct ones, and we know that intellect is

often weaker than the animal feelings out of which it arises. It is apparently by a process of conversion of energy that our intellectual acts are produced by prior material ones; thus the energy of oxydising cerebral tissue is accompanied by mental action. We know that one direction of visible motion in a machine can be converted into another—for instance, reciprocating into circular, etc.; and as the laws of motion of small bodies are the same as those of large ones, it is reasonable to conclude that one kind of invisible molecular motion can be converted into another in the human body and brain as certainly as visible motion is in an inanimate machine. The usual cause of conversion of energy and of the changes occurring in nature is difference of property and motion of adjacent substances.

All cases of morality as here defined are instances of action and reaction, chiefly between human beings and between men and other animals; also between each man and his environment, and between his brain and his bodily organs. Thus the mere sight of valuable property causes the thief to steal, and bodily feelings excite moral and immoral ideas. We are always under the influence of motion, from within and without, from the

cradle to the grave, compelled to act or to refrain from acting, and are equally obliged to accept, sooner or later, some of the consequences, whether pleasant or painful, of our conduct. This is not fatalism, because scientific effects are always conditional, while fatalistic ones are entirely unconditional. Similar to all other material bodies, man is inexorably bound by law and circumstances, though he often does not like to think so, because it curbs his desires.

The world is not governed essentially by what we with our narrow ideas consider "justice," but by material necessity, and it is only when acts of natural causation happen to agree with those ideas that we consider them just. We are so ignorant and conceited that we forget our littleness, and cannot believe that great terrestrial powers, such as earthquakes, lightning, etc., are just towards us. Why do the weak yield to the strong in all cases? It is simply because all natural actions are essentially of a mechanical nature. In consequence of difference of circumstances and property in every different substance, all bodies act and react upon each other, and each governs in proportion to its power; the large celestial globes govern the small ones,

and the small ones react upon them; the stronger animal feelings govern the intellect, and the latter react and in a less degree govern them. The powers of all bodies are limited by their mass and their motion, and by the fact that they cannot simultaneously possess contradictory properties; the existence of one property necessarily limits that of its opposite; thus a body cannot be soft and hard, brittle and tough. According to some writers, even a Deity cannot possess incompatible powers, for "How can infinite justice exact the utmost penalty for every sin, and yet infinite mercy pardon the sinner?" —(Dean Mansel).

As natural laws are invariable, the actions of all material substance are regulated, each celestial body has a definite speed of motion, and human progress has a definite rate, we cannot "hurry up a millennium." The rate of human progress depends largely upon fixedness of human habits, and upon the fact that when an idea has been firmly impressed upon the brain it remains until death, and prevents the reception of new ones. Human progress is a very complex phenomenon, and its rate is not measurable by us; but, notwithstanding this, its rate must be as fixed as that

of the earth in its orbit, because it depends upon the same ultimate causes and laws. It is the discovery of new knowledge which enables mankind to advance, and the diffusion of it maintains the state attained.

Our great degree of dependence upon universal natural causation is shown by the fact that each new advance in thought can only occur when all its necessary causes and conditions compel it. Thus, Newton could not make his great discovery of the law of gravity until Picard had measured the true length of an arc of the meridian. Similarly, the discovery of the fundamental cause of human conduct could not occur until Joule and many other investigators had proved by means of experiments, observations, and inferences, that every substance, and every particle of every substance, is in an incessant state of motion.

All change requires time, and dissimilar bodies require different periods to alter without injury ; human beings have often to make many preparations in order to prevent great loss and suffering caused by change. If any substance is too rapidly strained, it is damaged ; a stick, too quickly bent, breaks ; overstrained metals suffer permanent change, and men do

not entirely recover from greatly injured moral character.

In our own individual case our actions *seem* to be regulated by energy of volition ; but, as volition is not an uncaused phenomenon and cannot of itself create energy, we are really governed by the internal and external influences which cause our volitions. A steam engine seems to be regulated by its "governor," but the real energy exerted through that contrivance is that of the steam. Notwithstanding our seeming volitional power, we are nearly as helpless in the power of universal energy as the dust of a road is in the rush of a hurricane. Man desires, but energy performs, apparently in every case ; we are incessantly governed by climate, temperature, tides, state of bodily health, etc. All men are more or less controlled by ignorance : largely in consequence of deficiency of knowledge, disease and accidents kill millions of men prematurely every year. Very few die simply of old age, for in every man—

There is always somewhere a weakest spot,
Above or below, within or without;
And that is the reason, beyond a doubt,
A man "breaks down," but doesn't wear out.

—O. W. Holmes.

All substances more or less govern all

substances at all distances by means of radiations, and, as we are material bodies, radiant energy largely governs us. Thus we are held fast to the earth by rays of gravity, and are kept alive by rays of heat from the sun; we are also affected by rays of light, rays from radium, etc.

Man is a storehouse of energy derived from the food and air he consumes and the heat of the sun potentially contained in it. He is a structure in which energy is always active, with nervous organs for consciously or unconsciously liberating it, and producing either moral or "immoral" effects. Energy continually flows through him; it enters his body in the food and air he consumes, and escapes largely as bodily heat and movement. His body is always being consumed and renewed, and appears to be as truly kept in action by the energy of chemical union of the oxygen in the blood with his tissues as a steam engine is by the oxidation of the coal in its boiler furnace.

(c) SCIENTIFIC VIEWS OF LIFE AND MIND.

All kinds of errors are obstacles to the spread of morality. Books, etc., are continually being written without definitions of the

chief terms used in them. Through neglect of properly defining terms, and of limiting their meanings, the idea of universal molecular motion has been in some cases misused ; thus the well-known self-repair of crystals, and the spontaneous recovery of metals from internal strain, have been spoken of as "life in crystals" and "life in metals." That inanimate bodies, minerals, magnets, etc., potentially contain the rudiments of some of the properties of animals, such as action and reaction, is quite true ; but we require definite terms to indicate complex abstract ideas, such as life, mind, spirit, etc.; and it is misleading to call the invisible molecular motion of metals or crystals "life," because, as far as we know, "life" exists only in organic cellular structures.

The abstract idea of universal molecular motion is very similar to that of a Deity, and many persons have unscientifically spoken of God as being "an all-pervading mind." It is true that such motion has the qualities of omnipotence, omnipresence, infinity, and invisibility ; but it has not that of personality. Nor is it really "mind," because the existence of mind in the absence of nervous substance has never been proved. Nearly all men, through deficiency of suitable scientific

training, erroneously attribute human feelings to universal natural energy, and worship it as a personal God. A few scientific men fall into the same error.

The idea of the existence of a "mind" or "soul" as a separate entity, whether in the body or out of it, is another error opposing moral progress. It is really only a mental abstraction of our collection of thinking faculties; the independent existence of mind has never been proved, and the idea has for ages deceived millions of persons. Even if such an entity did exist, we have no proof that it creates energy with which to perform mental actions. If also, as science infers, such actions are really caused by natural influences under physiological conditions, there is no need of a separate entity or "spirit" to produce them. The mere ethereal or mysterious nature of a substance or action does not warrant our calling it a "spirit," "spiritual" or "supernatural."

The idea of the existence of a "second self" within us is another unproved assumption, and appears to be explicable by ordinary physiology. Under the influence of suitable stimuli all our organs act "automatically"; the legs walk, the lungs breathe, the heart

beats, without supervision by the intellect. Similarly, under the stimulus of indigestion, cerebral excitement, etc., the brain thinks during dreams ; and this kind of thinking has been attributed to a "second" or "subliminal" self within us. Thought, whether conscious or unconscious, if uncorrected by intellect and training, is often unhealthy, and sometimes dangerous. In the *conscious* state, in men and women, all kinds of crime are committed under its influence. Similarly with animals, they have less intellect than men, and are audaciously guilty of instinctive deceit, theft, and murder. In the *unconscious* state, as in dreams, even suicide and murder have been committed, and many somnambulists have seriously injured themselves. Nevertheless, in highly intelligent and trained persons dreams are occasionally correct, and acts of thinking have on rare occasions been performed during them which could not have been done in the waking state, in consequence of disturbing influences. As dreaming, somnambulism, trance, etc., are reasonably explicable by ordinary physiological automatism, there is no need of the assumption of "a second self" to explain them.

We may approximately limit the term

“mind” or “soul” to the collection of faculties or actions termed consciousness, observation, comparison, inference, and imagination; and, as far as we know, these exist only in living nervous organisms. Further, in the long series of living structures, from plants up to man, wherever mind appears, there also is nervous substance. Mind is a species of life, and life may be scientifically viewed as a kind of motion; but motion alone, separate from organic structure, is neither life nor mind: metals and crystals have internal motion, but do not live. Wherever mind exists questions of morality begin to arise, because moral action is largely mental; and mental action is produced, as far as we can infer at present, partly by oxidation of living nervous substance. Sooner or later, by the aid of new discoveries, life and mind will probably be much more precisely defined as particular forms of internal movement occurring only under special conditions in suitable organisms; but, as the human intellect is nearly powerless in such profound and complex questions without the aid of proper and sufficient evidence, we must work and wait for more discoveries.

In consequence of insufficient knowledge of

scientific principles, and of how to use them in explaining mental phenomena, a great mystery has been made of consciousness. Consciousness and attention are largely synonymous ; each consists merely of a certain degree of activity of the senses, and this increases with the strength of influence of the environments upon them : the stronger and more sudden that influence and the more excitable the senses, the more vivid the attention and consciousness. Consciousness is largely increased by the perception by one sense of the action of another in the same organism, and there are all degrees of it. Perfectly automatic actions, such as those of some of the viscera in a healthy state, are not usually noticed by the senses, while those which are violent or are accompanied by great pain or pleasure are strongly perceived, and when several senses are simultaneously and strongly excited, each one perceives the excitement of the others, and, by co-operation, heightens the effect. Thus, if we suspect a great danger close at hand, such as our house on fire in the night, several senses are excited ; we see, smell, and taste the smoke, we hear the sounds of burning, we feel our heart beating, and feel and see our body trembling, and each sense

perceives, more or less, the excitement of the others, thus increasing the total feeling. Consciousness is intimately related to morality; the more conscious we are of our actions, the more accountable are we considered to be for them.

(d) DEPENDENCE OF MORALITY UPON UNIVERSAL CAUSATION.

Next in importance to the dependence of morality upon universal motion is its relation to universal causation. Abundant evidence exists to prove that moral and immoral actions are as much cases of cause and effect as motion produced by steam, and the great assumption that some natural phenomena are produced without a natural cause has never yet been proved. All men are caused to perform acts of "good" and "evil," friendship and enmity, by the influences within and around them. In some cases many causes produce a single effect, as in the maintenance of a good character; while in others a single cause produces many effects, as in the sudden destruction of that character by a criminal act. Given unlimited time, the smallest cause may produce a very great effect, as continually occurs in the washing away of mountains by rain, and

in the gradual loss of moral character by habitually telling small untruths. In other cases the number of causes between the earliest one and the effect are many; but this, like the number of links in a chain, makes no difference in the result, provided all the intermediate connections are certain. Lapse of time, also, has no influence. Thus we are as certainly descendants of the first human couple, and inheritors of some of their moral qualities, as of our immediate parents. Many persons want to know "the first cause of all things," not thinking that this is quite beyond our feeble powers, and that every cause must have had an earlier one to produce it. Causation acts as surely in a complex machine as in a simple one, in a man as in a windmill, in morals as in mechanics, provided all the necessary conditions are present. This statement is based upon the great principles of indestructibility of motion and continuity of cause and effect; but the degree of certainty in morals *seems* to be less than in mechanics, because the more numerous conditions confuse us. Nearly the whole of our difficulty in understanding complex subjects arises from the smallness of our knowledge and the very limited powers of the human brain. As moral

qualities are not often measurable, it is not much wonder that we cannot assess moral values.

Under the influence of universal motion and causation, acting according to invariable laws, all material bodies, ourselves included, "do as they must," and we are so far justified in all our actions, whether moral or immoral. Some persons are alarmed at this great scientific statement, as if it were wrong to submit to greater powers than our own ; but, whether we consider it right or wrong, we have no choice in the matter. Even the great globes in space are compelled to obey, and why should not we? It might be supposed that, if this were true, it would render unnecessary all praise and reward, punishment and blame ; but, as causation is not suspended in the mutual presence of any two bodies, we are still compelled by the influence of our environments to encourage "right" and discourage "wrong" by all the ordinary means. We may reasonably conclude that even the greatest criminals "do as they must"; and this is the truest charity, because, while it does not prevent correction of "immoral" conduct, it calms revengeful feelings, and prevents undue punishment. As the stomach

is more clamorous for food than the brain is for learning, the necessity of getting an income is with nearly all men more urgent than love of truth or virtue. Multitudes of persons are compelled by this influence to do all kinds of "immoral" and "criminal" acts; and this is largely proved by the great number and variety of "crimes" they commit. Persons are not to be entirely blamed for the acts they commit under compulsion, and we cannot so heavily punish a man for his "evil" actions if we are fully convinced that he "does as he must" under all the conditions and circumstances.

All bodies whatever, men included, have only limited powers, and this is largely due to the circumstance that a body cannot possess contradictory attributes nor perform incompatible actions simultaneously. Thus it cannot be both hot and cold, nor move in opposite directions at the same moment. A man cannot be alive and dead concurrently; and, as we cannot perform incompatible acts, nor exert superhuman powers, we must not expect too much of each other, but make allowance for human weakness. It is evident from these and other facts that the great scientific truth, "contradictories cannot coexist," lies at the

basis of all human conduct, whether moral or physical.

As the influences within and around us are often stronger than our wishes, obedience to them is a necessary condition of life; our internal stimuli require us to breathe, and we must either do so or die. In going through life we are as truly compelled by natural influences to move or refrain from moving as the blades of grass in a field are by the force of the wind. Ask any man why he did a particular act, and he will probably say that he does not know, or that he was compelled to do it, or that he did it by his own free will. In the first case he may have been moved by an unobserved cause, in the second by an observed one, and in the third by an unnoticed one which coincided with his volition at the moment. When a man retires from business he is usually compelled by the circulation of the blood in his body and brain to seek some other occupation. We cannot carry out our "will" to "do as we like" in any case unless our volitions happen to agree with the natural powers that govern us, and which, by supplying energy, are the real causes of our acts; we cannot, by merely "willing it," fly across the Atlantic Ocean,

nor even swim across the Straits of Dover, unless those powers are propitious. "Freedom of will" is like a mirage—the farther we scientifically examine it, the more we find the effect to be due to natural causes. The government of the world by universal energy underlies all our arrangements. Obedience to greater powers is indispensable to politics, sociology, morality, and religion; it allows no distinction between men—all must submit to it. Out of it arise all our systems of law and rules for maintaining life and health, and for performing all our legal, social, and moral duties.

Every one of our actions, if properly interpreted, proves that we "do as we must." Thus we all must die in order that our successors may live. Each man is compelled to be born, to accept his position in nature, and when he ceases to be useful he is usually forced out of sight. He is compelled to suffer pain, anxiety, poverty, ungratified desire; to be praised and blamed, punished and rewarded; to work and wait, to love and hate; to discover and invent, to fail and to succeed; to acquire numerous mental and bodily diseases and deformities, and numberless false ideas which he can never erase; to

commit crimes, to believe untruths and promulgate them; to deceive and be deceived in nearly all directions, because, while there is usually only one true explanation of a phenomenon, there are often many false ones, especially in the very complex phenomena of psychological research, morals, and spiritualism.

Some persons seem alarmed at the numerous changes wrought by science, and ask: "Where is science leading us?" Tell us, oh, tell us, how far will science go? Farther and farther is nearly all we know. As we cannot predict as surely in morals as in mechanics, we should be reasonably content with the knowledge we possess until we can discover more, and probably when more is found, and more is understood, we then shall better see that "all is good." All things, even our ideas of morality, are changing. Matter and change are inseparable, and their union and continuance are so perfect that we are practically compelled to accept them as complete.

"Everything that exists depends upon the past, prepares the future, and is related to the whole"—(Oersted). Continuity unites all natural phenomena in one great flowing scene, the present to the past and future. It

is the basis of all heredity, and of all history of morals and other subjects. It secures fulfilment of prediction of future events, as in eclipses, and in the discovery of substances which we have never seen, but which are subsequently obtained, as in the case of Helium, etc.

(e) SCIENTIFIC VIEWS OF GOOD AND EVIL.

The subject of morality is very largely composed of questions relating to "good" and "evil." Scientifically defined, "good" is that which serves some useful purpose, not merely to mankind, but to the entire universe. Any narrower definition than this leads to numerous contradictions which prove its falsity, and what we term "evil" is mostly that which unjustifiably produces pain, anxiety, or injury to sentient creatures. A common idea of "evil" is anything which produces pain; but this is a great mistake, because pain is simply a sensation which we fear and dislike. It is manifest that if any so-called "evil" prevents a greater one, it must be good. Thus the pain of amputation of a limb in order to save a life is not an evil. That which does good is good, and as the welfare of this globe and all upon it is vastly

more important than that of men alone, earthquakes and volcanic outbursts are good because they relieve the crust of the earth and prevent the occurrence of greater ones. Actions are not necessarily "evil" because they are violent or rapid, nor is the universe imperfect because all things in it are constantly changing and causing us pain and anxiety.

The belief that pain is "evil" is one of the greatest of human deceptions, nearly every person entertains it, and there is no false idea so firmly fixed or so easy to acquire. This is due to the fact that we all suffer pain, and the idea that it is "evil" has been bred in us, and taught afresh to each new generation. This false idea is, however, often useful to those who cannot realise the truthful one. That pain is not evil is shown in many ways; insensibility to it is often dangerous, because it warns us of approaching disease; thus the incipient pains of gout bid us properly regulate our diet and exercise. Pain is our great disciplinarian; if it were not for the anticipation of it, we should often injure ourselves. "The burnt child shuns the fire." The painful prospect of poverty makes us thrifty; without the pains and anxieties of

earning an income we should lapse into idleness, luxury, and disease. The desire to escape pain and increase pleasure compels us to train ourselves, acquire knowledge, discover new truths, invent contrivances, seek new remedies, etc. As inanimate bodies undergo violent changes, and all animals suffer pain and death, why should not we? We strongly object to having more pain than we are able to bear; but even in this case we often have to submit to greater powers, as in the case of epidemics, etc. Trials are not "evils," but pain to be borne or work to be done.

"As ignorance, untruth, and false beliefs are great sources of human suffering, it might be supposed that they are really 'evil,' but we know that in certain cases untruths are more useful than truths to unlearned persons, simply because they are more easily understood. Thus the idea of the existence of an evil Deity has been very useful in its time, and so has that of a heaven and hell. We pay physicians to prescribe poisons to cure our bodies, and why not pay for untruths to console our minds? Various false beliefs have been, and are, great consolations to millions of anxious persons who have never

had a chance of learning the great truths of science. Untruthful orators have induced multitudes of persons to think and improve who would never have done so, and the immense 'evil' of ignorance affords a livelihood to great numbers of professional men, tradesmen, and others, to supply the lack of knowledge in other persons. Anything which gratifies desire will 'sell.' If it were not for ignorant enthusiasm and exaggeration, many good undertakings would not be carried out. Men are not to be blamed because they are compelled to believe untruths; probably every false belief would be found to be useful if it were scientifically investigated. Nevertheless, truth is more virtuous than untruth. Not the strictest truth, but 'probability,' is the great guide of life."

If we view the subject in a comprehensive manner, we find that each seeming "evil" is usually followed by a greater good. Thus every man is compelled to pay rates and taxes in order to secure safety of life and property, and the greater good thus acquired more than justifies the lesser "evil" needed to produce it. Each man has to suffer for all in order that he may gain the support and protection of all. Even the premature death

of multitudes of human beings by disease, etc., has the good effects of regulating the density of population and the speed of human progress, each of which, if too great, would ultimately cause greater disasters to the species.

As pain and pleasure are states of the nervous system, morality is based upon physiology. The scientific basis of morality is further proved by the fact that the variety and number of pains and pleasures increase with the complexity of the animal structure, and are greatest in civilised man ; and, if the human organism were still more complex, it would be liable to a still greater variety of pains and pleasures. Good and evil, pleasure and pain, are largely equivalents of each other ; the greater the pleasure, the more we have usually to work or pay for it. As the ideas of good and evil are extremely complex they are largely unmeasurable, and we are often obliged to guess their magnitudes.

Many persons have asked : " Why does evil exist ? " The answer is : For the same reason that all phenomena exist—viz., because it is a necessary consequence of universal energy acting upon material bodies. Good and

“evil” are produced by the same natural causes, and often there is no essential difference between them. Thus “virtue in excess is vice,” and pleasure, when too intense, is pain. “Evil” is due to our internal and external environments, and these are almost endless in number and variety. It is also largely due to our limited powers, especially to the smallness of our knowledge, the fewness and narrowness of our senses, and the undeveloped state of our brains. There are thousands of actions occurring within and around us every instant which our senses cannot perceive, and nature is full of phenomena which we cannot explain. Each of our powers, except our intellect, is surpassed by that of some other animal. Thus our vision is weaker than that of an eagle ; we cannot run as fast as a greyhound, fly like a bird, or swim like a fish.

Why has not man a microscopic eye ?

For this plain reason, man is not a fly. —*Pope.*

In consequence of his limited powers, each man is frequently making mistakes, neglecting the rules of health and moral conduct, injuring himself and others in many ways, resorting to deception, violence, and crime, in order to effect his objects ; and, in some cases, through

despair of succeeding in life, committing suicide. The moral fall of men and women is often caused by inability to resist the influence of environments. Nothing, perhaps, shows more plainly the limited powers of man than the multitudes of crimes he commits and the endless variety of pains, errors, and deceptions to which he is subject. Not only man, but all inanimate bodies, have limited powers, which frequently give rise to disasters. Bodies break by their own weight, internal weakness, etc., and it is, therefore, no moral defect in man that his abilities are not greater than they are. Nevertheless, defective machines must be strengthened, and wrongdoers must be corrected, in order to prevent future disasters. The more ignorant the person, the more is he carried through life by the stream of events, without prediction or correction on his part, and the more is he subject to accidents.

The problem of "evil" is extremely complex, and is "the great puzzle of mankind." Numerous moralists, theologians, and metaphysicians have tried to solve it, but have largely failed, partly through deficiency of suitable scientific knowledge. The term "evil" is an extremely conventional one and very difficult to make clear, because it depends

on so many conditions. Thus, what is "evil" to one man at one time is often "good" to another man or at another time, or under slightly different conditions: deaths are good for the undertaker. The problem is rendered more confusing by the circumstance that each man's view differs from that of every other man, and that "evil" may be viewed in two very different aspects — viz., the ordinary narrow and deceptive one and the broad, scientific, and true one—and these two views often contradict each other. As real contradictions do not exist in nature, these must arise from the fact that the narrow view is an imperfect one. The subject is still further mystified by the fact that the whole of nature is in a continual state of change, and that our idea of "evil" is constantly changing with it.

In addition to all this, the innumerable different views taken of "evil" are so contradictory that the problem remains insoluble to nearly everybody. In such a complex case the best guide to truth is a correct theory, because it yields true inferences—to refer the question to great scientific principles and view it in the most comprehensive aspect; but even a true theory, aided by most profound meditation, is not a sufficient guide to truth in

the most difficult cases, partly because the human mind is unable to attach true values to all the numerous circumstances. The only theory which is perfectly consistent with all the evidence is the scientific one—viz., that the universe and all it contains is perfect, and that each individual body is perfect in its own sphere and circumstances at the time; but this idea seems so opposed to our experience that it is quite beyond ordinary imagination. Our view of the universe must not, however, be contracted to suit narrow human capacities, but be expanded so as to represent the universe as it really is.

Each extreme view has its uses, and both are necessary—the narrow or so-called “practical” one for deciding what is best for the individual, irrespective of the welfare of others, and the broad one for general human welfare and prediction of consequences. In practical life both views should usually be taken and acted upon. Commonly, however, “self-preservation is the first rule of life”; but, as our automatic impulses are often stronger than our intellect, the selfish man obeys this so-called “first rule” and neglects the rights of his fellow-man. “The real first rule of life is to do the greatest good.”

According to the narrow view, "there's something wrong in everything": man is full of sin and very imperfect, and the earth is "badly governed"; but, according to the broad one, "whatever is, is good," and all things are perfect in their respective spheres and fit for future change. Things are not imperfect because they are changing; all are doing so. As no substance can possess contradictory attributes, all bodies are limited in their properties and powers, and therefore cannot act otherwise than they do; and, as all "do as they must," their so-called "imperfections" are only limitations; thus, an oyster is as perfect in its sphere as a man. A body is not imperfect because it is simple, nor because it is complex, nor because it has limited powers; thus, a pin is as perfect as a watch, a mouse as a man, each in its own particular station. A sleeping man is not imperfect because he is wholly guided by automatic action, without the help of intellect; he is only a more limited being. A man must not be unreservedly blamed because he is not other than he is, nor for the crimes arising from his environments and limited faculties. These considerations do not, however, exclude the corrections necessary to progress.

Then say not man's imperfect, Heaven's in fault ;
Say, rather, man's as perfect as he ought.—*Pope.*

Each man has no choice but to take the special view of nature which his entire environments compel him ; and, as the influences acting upon the brains of any two men are never entirely alike, each man's view differs, more or less, from that of every other man. The views taken by different persons vary in comprehensiveness and truthfulness directly as the extent of their knowledge of fundamental principles. The narrow-minded man is usually more convinced of the truth of his false ideas than the broad-minded man is of his true ones, largely because his ideas are fewer, simpler, and more fixed. The obstinacy of ignorant persons is proverbial, and often continues until death, because their passions are frequently stronger than their intellects, and they cannot erase their false impressions.

The ideas of different men and the actions of different bodies must be either harmonious or discordant, and, if discordant with each other, conflict and conversion of energy occur. It is largely in consequence of contradictory ideas that wars in general arise, and these differences are easily traceable to the influence of unlike environments, fixed ideas, and

limited knowledge. The rudiments of war and crime are visible in nearly all animals ; the phenomena of conflict exist throughout nature. There are " wars of the elements " as well as of men ; even plants contest for a living ; and all this is due to differences of property and action of material bodies. Conflicting views in politics, morals, and theology are necessary parts of human life ; they result in evolution, advance, growth, and decay of men and nations. We are often strengthened by conflict which we are able to bear, and trials, if rightly accepted, usually do us good.

The true and broad view of " evil " is that while pain and suffering are all around us there is no real evil. First, because its existence would prove the universe to be imperfect ; second, if the physical constitution of the universe is perfect, as scientific evidence declares it to be, the moral arrangement, being inseparable from it, must also be perfect ; third, whenever a case of seeming evil is fully investigated, it is ultimately proved to be necessary and good ; fourth, it has been abundantly proved that pain is necessary to human existence and welfare in many ways ; fifth, as great " calamities " serve useful purposes, and many so-called " evils "

prevent greater ones, they must be good; sixth, "evil" acts are produced by natural agents in the same manner as good ones; seventh, the greatest "evil-doers" are compelled to act, the same as all other persons and all inanimate substances; eighth, it would be inconsistent if all other animals suffered pain while man alone was exempt; ninth, even the feeling of so-called "evil" is limited to an extremely minute portion of nature—viz., animal brain in the waking state, and in that only occasionally; tenth, no consistent theory of human life has ever been framed upon the idea that real evil exists; eleventh, the universe works so as to secure the greatest good to all things; and twelfth, belief in the existence of "evil" is easily accounted for by our frequent experience of pain. Considering all this evidence, it is incomparably less likely that the moral perfection of the universe is defective than that we, with our very feeble minds and fixed belief in the existence of "evil," are deceived in such a vast and complex question.

It may be objected that, if such a belief was not a true one, it would not exist in nearly every human mind and be irremovable. But we know that some of the greatest errors have

been believed by nearly all men, during many centuries, until expelled by science—*e.g.*, that of the rotation of the sun round the earth. The question might also be asked: What is the use of the conclusion that the universe is perfect if it cannot be at once applied to relieve human suffering? The answer is: It has been, and can be, so applied by intelligent persons who possess suitable and sufficient scientific knowledge. The advantages of scientific morality are immediately applicable; but whether they can be fully realised at once is a minor question. Great ideas require time to grow, and to obtain oaks we must plant acorns many years in advance.

The coming system of morality is a much more reliable one than any at present existing, because it is entirely founded upon truths which have been proved by means of proper and sufficient evidence. "Truthfulness is the basis of all the virtues." When men have true principles to guide them they agree, because their leading ideas are the same. The reliability of science depends largely upon the fact that the testimony of inanimate substances and impersonal powers is free from bias. We cannot alter a fact; it is a fact forever. Uncertainty means danger, and

truthful ideas are essential to the highest morality.

To believe from sufficient proofs that the universe is perfect, that real evil does not exist, and that all men "do as they must," affords relief of mind in many trials, and constitutes a sound basis for the much-desired "government by love." It diminishes hatred of our fellow-men, and requires us to forgive our enemies ; but it does not relieve us of the duties of discovering truth or of improving ourselves and others. The greatest preventive of pain is knowledge. New knowledge is the starting-point of human progress ; and the most powerful cause of national advance is the general diffusion of comprehensive scientific discoveries. Fundamental scientific knowledge is the greatest promoter of peace. It enables us to correct error and detect deceit ; it makes life more worth living ; and that it prolongs life is shown by the fact that scientific philosophers live longer than the average period. Scientific experience makes us more exact, careful, and reliable, and, by increasing our knowledge of the future, enables us to arrange beforehand so as to secure our safety and correctness of conduct. The great uses of science in preventing,

alleviating, and removing bodily pain, transmitting intelligence, etc., are well known. But, notwithstanding all this, and very much more, it is often called cold, dreary, etc., by emotional persons, because it does not encourage irrational beliefs and desires.

The idea of universal goodness is an old one, and was originally a mere conjecture; but it is now abundantly supported by facts, and mankind will be gradually compelled by the pressure of advancing knowledge to accept it. At present it needs competent expounders, and it is merely our lack of suitable scientific knowledge, and our frequent experience of pain, that hinder our believing it. Like other great truths which mankind have been slowly compelled to accept, it is strongly at variance with some of our feelings, while perfectly in harmony with intellect.

If the foregoing system of morality were taught in schools, it would produce intelligent, practical, and moral human beings, each one acting as a law unto himself, and would ultimately result in evolving a more truthful system of religion than any at present existing.

IV.

A SCIENTIFIC VIEW OF CONSCIOUSNESS

So many attempts have been made to give a clear explanation of consciousness that it may appear superfluous to make another. There is, however, a constant human desire to know everything new and reliable on the subject, and this desire seeks to be gratified. Consciousness is one of a great number of "mysteries" by which we are surrounded; it is like a "certain something in the air, that all men feel, but no man can describe"; its mystery arises largely from its complexity and the smallness of our comprehension, and as long as we act upon the unscientific idea that "belief is not to be controlled by facts," or that we can safely believe without evidence, we shall be confused by such mysteries. The mode of action of any one of the senses, especially that of vision, is nearly as great a mystery as that of consciousness. The chief explanation of the large failure of attempts to explain consciousness is that they have usually

been made without the aid of sufficient familiarity with the fundamental principles or methods of science—the entire history of mankind proves that without extensive and varied knowledge of science it is hardly possible to obtain truthful ideas of the mysteries of nature. Consciousness is a wider subject than that of the ordinary senses, because it includes all kinds of feelings from all parts of the body. As the subject is large, only an outline of it is attempted in this essay; and as it is complex, the essay requires attentive reading.

(a) DEFINITION OF CONSCIOUSNESS.

We cannot clearly understand a subject unless we define its chief terms; undefined terms are used as means of evasion in discussion—a true definition of it must be one which agrees with all facts relating to the subject, and may be conveniently stated as a clear perception of existences within and around us. According to a large amount and variety of scientific evidence, ordinary consciousness is essentially a high degree of activity of the cerebellum or “little brain,” and this organ is largely recognised by physiologists as being the “sensorium” or seat of feeling. We have

no proof that consciousness can exist without nervous substance.

Consciousness and unconsciousness differ only in degree, and merge into each other by imperceptible differences. Consciousness is a part of mental action, and the terms "consciousness" and "perception" are nearly synonymous. It is a complex nervous action superadded to vitality; thus trees live, but do not feel. It is a part of life in all animals, and rudiments of it exist in certain plants. It is essentially the same in all nations and all ages. All human beings experience substantially the same joys, griefs, pains, and pleasures in consequence of possessing the same cerebral structures, and being acted upon by the same general powers and circumstances. At the same time, the varieties of consciousness are as numerous as those of living creatures.

(b) MYSTERY OF THE SUBJECT.

The subject of consciousness has been greatly mystified by an undue desire to know "the inmost nature of things"; but this is beyond our powers. We cannot "realize" the "inmost nature" of anything, simply because it is so extremely profound, and our conscious-

ss and intellect are so very finite. However much we discover, there always remains a vast amount more to be found. Our nearest approach to that of consciousness is that it is a special kind of motion, which only occurs in living nervous substance. To ask what it is in itself "is an irrational desire; in such profound subjects we must be content to learn what we can, and wait for further discoveries. The "first cause" is equally inscrutable, for the simple reason that in all cases there must be an earlier cause, and so on without end. When we know more deeply the nature of the senses, we shall more nearly know that of consciousness, because the senses and their organs are the immediate basis of it.

It has also been mystified by an assumption of the existence of a "second self" within us, distinct from our ordinary "self" but the probably true explanation of this "second self" is the occasional separate excitement of separate portions of our cerebral hemispheres. We know that memory, perception, observation, attention, comparison, inference, and imagination, are all more or less acts of consciousness; we also know by means of dreams, illusions, etc., and inferences from them, that similar phenomena frequently occur

within us but are barely observed, and that these slightly noticed cerebral actions tend to influence our conduct in a similar manner to the fully noticed ones. We have often a faint degree of consciousness of our dreams on waking; but such faintly conscious dreamy phenomena are far more consistently explained by unequal cerebral action than by the hypothesis of a "second self." Such sensorial actions are often unnoticed, either because they too feebly excite the sensorium, or the latter is either too obtuse or too preoccupied to perceive them; but they are occasionally so strong and persistent in some persons as to haunt them after waking. Dreams are often fortuitous medleys of ideas uncontrolled by comparison and inference, and are probably produced by the cerebral circulation exciting latent imprints of the sensorium in an irregular manner. They are not, however, always medleys, but are in rare cases consistent series of thoughts and tendencies to action automatically produced under undisturbed conditions. We have in a slender degree occasionally the power of observing and criticising our dreams during their occurrence, but only at great risk of the dreams themselves being interrupted, and of

this power being disconcerted by the dreams; and this indicates that the dreaming and observing organs are in some degree separate, but very nearly related, similarly to the sensorial and cerebral hemispheres by means of their "commisures." Through deficiency of suitable knowledge, the ordinary waking thoughts of many persons are much like those of dreamers. The idea of consciousness has been still further mystified by the assertion that it still exists in some occult form eternally after death. But if the existence of myriads of "souls" in space is a reality, the omnipresent radiations in space should be affected, and we are far more likely to detect their existence by means of scientific appliances than by our unaided consciousness, because the former are very much more sensitive than the latter.

(c) DEPENDENCE OF CONSCIOUSNESS UPON
NATURAL CAUSES.

Consciousness depends upon a number of conditions and circumstances, the chief of which is the presence of nervous living matter in a state of motion. The fundamental cause of it is the natural energy of our environments acting through the senses ;

but the immediate cause is the action of the senses themselves. Nearly all parts of our body, and especially its outer surfaces, are supplied with sensory nerves ; and the sensorium is automatically excited through these nerves by numberless external and internal influences. As these influences are of various degrees of strength, and the sensorium varies greatly in sensitiveness, consciousness is of all degrees of intensity, varying from the faintest perception to the greatest pain or pleasure, from peaceful sleep to raving madness. Its degree depends upon the physical state of the brain, the extent of its excited surface, and the intensity and suddenness of the excitation. It is the loudest sounds, the strongest lights, the greatest pains and pleasures, and the most sudden of all these, which most excite it ; in inflammation of the brain or of its membranes the least sound or light excites it greatly. It is often increased when several senses are simultaneously excited ; thus lightning accompanied by thunder is very impressive. The perception of optic images by the eye may be regarded as a part of consciousness.

Consciousness is aroused by a great variety of influences, usually by all those which excite

the brain or senses ; its most common cases being hunger, thirst, and desire. In consequence of the multitude of causes which affect it, it varies from minute to minute, and each man's brain is in a number of different conscious states in succession ; thus the man asleep and awake, drunk and sober, are very different persons. In ordinary cases the actions of the two halves of the brain blend together, similarly to those of the two eyes ; but in some cases the same individual appears in inconsistent characters at different times, in consequence of inharmonious cerebral action. The degrees of this variation of consciousness in the same human body has in some cases been so great that the "original self" and the "second self" have entirely forgotten each other, and the changes from one state of the sensorium to the other have happened suddenly. Such great changes as these nearly always occur in emotional persons, and are regarded as signs of insanity. As consciousness is not an independent entity, but an active state of nervous substance, its changes in such extreme cases cannot be reliably ascribed to the existence of two different persons in the same body, but to inharmonious action of the cerebral

hemispheres. Great bodily changes cause great alterations of consciousness : the change from grub to butterfly must be an extreme one.

(d) MODE OF EXAMINING THE SUBJECT.

Further, the rise and fall of consciousness entails other changes. Thus, the series of cerebral alterations attending an act of perception does not end with it, but leads to other occurrences. It gives rise to trains of thought, reflex muscular actions, changes in the viscera, etc.; or its energy is stored up, like the heat of the sun in coal, and accumulates in the system, ready to be expended in action when liberated. In such a very complex subject the human brain is too small to grasp all the phenomena, their causes, relations, and effects ; and the best way to arrive at truth in it is not to accumulate a large number of complex personal narratives, but to examine it by the aid of such a theory as agrees with all known facts and all their logical consequences. A suitable theory is supplied by the great principles of universal causation, evolution, motion, radiation, automatism, action and reaction, etc. It has been proved, largely by means of the spectra of substances and by astronomy, that all bodies,

human beings included, are in a state of incessant motion, both internally and in their masses ; that they are in a state of continual change of motion, of increase and decrease, growth and decay ; that these movements and variations of movements are the essential causes of other changes in all living and dead substances ; that all bodies more or less automatically act and react upon each other ; that even the different invisible movements in bodies influence each other. Thus, every substance, whether living or dead, is always sending rays of heat and of other forms of motion to, and receiving such rays from, all other substances, and is thus continually influencing, and being influenced by, them. The sun, radium, and magnets are familiar examples. We know that rays of light exert pressure on solid bodies ; and it has been shown by experiments with a cube of lead weighing seventy-four hundredweight that a variety of substances emit rays which affect a voltaic cell (see *Philosophical Magazine*, 1897). In these and many other ways every different substance and creature behaves as a different aggregate of movements and as a different machine.

(e) DEPENDENCE OF CONSCIOUSNESS UPON
NATURAL ENERGY.

We may conclude from these facts, and a multitude of others, that nervous matter is always moving; that cerebral motion is essential to consciousness; that automatic action and reaction are universal; that the human machine is largely automatic; and that automatic action in the human body is essentially the same as that in inanimate substances. There is continued action and reaction between man and all things around and within him; all his organs act and react upon each other. We are all of us influenced by food, weather, our servants, neighbours, creditors, the tax-collector, by all who know us, and by all kinds of circumstances within and without; and we react upon them from birth until death. Our feelings influence our intellect, and our intellect reacts and restrains our feelings. We feel, and by reasoning we know; we know, and consequently we feel.

Some of these powers act upon us without our directly perceiving it. Thus, by influence of food and air we grow, but we do not feel the act of growth; by that of gravity we are carried through space at the rate of more than

eighty thousand miles an hour, without feeling it. Even our volition is no exception to automatic action and reaction. Thus, we cannot by an effort of will alone prevent feeling cramp, colic, or toothache. The chief natural energies are vastly stronger than man: under their dominion he is like "clay in the hands of the potter." They move him before he knows why. Even when he commands he must first obey; and although action and reaction are equivalent in every case, stronger power universally overcomes weaker. In this way man submits to all sorts of pains and calamities, and individual consciousness is governed by nature. We fancy that we are governed by a "spiritual ego" within us, because the effects we wish follow so certainly our volitional desires, and we cannot detect their origin. But as we cannot create energy, we only act when we are acted upon, as when our stored-up energy is transferred or set free by some unnoticed natural change. In nearly every act of volition there is some influence so feeble, or our attention is so preoccupied, that our consciousness does not perceive it; but that does not prove that it is a spirit producing energy out of nothing. The error of believing

that "mind" is a spiritual entity is so extremely insidious and tenacious that it deceives millions, including many of the most learned persons. Natural energy acts through us as it does through all animate and inanimate bodies, and it is only when our volitions happen to agree with its operations that they succeed. Usually we only try to carry them out when the natural conditions are favourable, because we know that it is useless to try when they are not. But although we cannot directly overcome natural powers greater than our own, we are stimulated by our failure to indirectly render them subservient to our desires by the aid of suitable knowledge, and this is strikingly shown by the numerous triumphs of science and art.

(f) RELATION OF AUTOMATIC ACTION TO
CONSCIOUSNESS.

Various parts of our nervous system may be automatically active without exciting the sensorium. Thus, the nerves which regulate our internal organs are always active; our lungs breathe automatically; the heart beats unceasingly; the stomach digests during day and night, each without exciting consciousness

except when diseased ; and we even walk to a large extent automatically. Each sense acts automatically when acted upon by its own special causes, and appears to have a locality of its own in the sensorium. Spontaneity and persistency of consciousness, so necessary to professional eminence, depend largely upon training, education, and state of bodily health. The great perfection of expression, direction, and sense-action, which occasionally occurs in our dreams, shows how perfect even mere automatic brain action may be when undisturbed.

Inanimate natural energy is the most fundamental prime mover in human conduct ; it acts whether we feel it or not. Consciousness comes next, and intellect the last. We are usually impelled more powerfully by our environments, poverty, lack of food, etc., than by feeling, and more often by feeling and sentiment than by intellect. Life is too short to allow us to reason out every action before performing it. Why is intellect so generally weaker than feeling ? Simply because it is evolved out of it, and that during this transformation some energy is converted into heat and lost by diffusion. We know that thinking makes the head hot, and that nearly all

transformations of energy are attended by loss. That the origin of consciousness is automatic is proved by the fact that, when all its causes and conditions are present and its preventives absent, we cannot by our strongest desire prevent its occurrence. Thus, we must feel the cold of winter and the heat of summer whether we are willing or not. Consciousness, similar to all other forms of motion, is subject to neutralisation and inhibition by opposing influences. One of the conditions of our being conscious of any particular feeling or idea is that the brain be not pre-occupied by a contradictory or a stronger one ; thus, we cannot attend to a trifling matter while fully occupied by an opposite or a serious one. Similarly, a substance cannot be in two contradictory states, such as hot and cold, at the same instant. This inhibition of feeling and ideas by each other explains the seeming fortitude of warlike Indians, sectarian martyrs, and others, while being tortured—their brains being filled with stronger and opposite feelings and ideas.

Automatic physical action underlies prospective as well as immediate consciousness ; “we live, and move, and have our being” in the ever-moving ether. Probably everything

within and around us, by its motion and properties, produces more or less permanent impressions upon our nervous ganglia. These impressions remain latent, and the strongly fixed ones are always ready to be excited by various causes. The number of such latent imprints must be enormous. It has been estimated that the total number of nerve-cells in the *grey* surface-matter of the human brain capable of receiving such imprints is about 2,000 millions ; but only a small proportion of these are considered to be used in dreams and conscious thoughts, the others being idle. Memory is aroused by the action of various external and internal influences upon these impressions ; and, during association of ideas, different parts of the cerebrum and sensorium act upon each other through an endless number of microscopically fine connecting nerve fibres, which compose the *white* portions of the two organs. As nervous matter is a very soft, solid substance, it is specially fitted for receiving impressions ; and as it is very mobile, and the white nervous masses are full of nerve-fibres, it is highly capable of transmitting them. Of the multitudes of our bodily actions and surroundings continually existing and changing, only a very small

proportion distinctly excite our consciousness, and the great bulk of them pass by without notice, though probably not without producing some latent impressions upon our sensorium. These impressions constitute the initiating material of our dreams, and of many of our waking ideas.

(g) NERVE SUBSTANCE INDISPENSABLE.

That consciousness is really a nervous action is shown by the circumstance that where nervous matter first appears in the long series of living plants and animals, there also consciousness commences. It is further proved by the fact that the greater the degree of excitability of the sensory nerves and ganglia, the greater is that of consciousness. As it only occurs when the excitement of the sensory nerves and centres is sufficiently strong, it is essentially a certain degree of sensorial activity. It varies greatly in different individuals. The nerves of some persons are so sensitive that their consciousness, hopes, and fears vary with each passing cloud. General consciousness is greater and more varied in man than in any other animal, and is more reliable in trained than in untrained persons.

(h) LIMITATIONS OF ALL HUMAN POWERS.

Man is a very minute part of the universe (all mankind are only about a 100-million millionth part by weight of the earth). Nearly all his powers are extremely small in comparison with those of inanimate nature; his nervous system is only a part of his body; his consciousness only occurs in his brain, and fully only during his waking state. Under the most favourable conditions his perception of sound only extends through a few octaves, and of light not beyond the mere red and violet rays of the solar spectrum. His power of scent is much less than that of the dog, of vision not equal to that of a hawk, and of rays of magnetism, wireless telegraphy, or gravitation he has no direct perception. The smallness of his consciousness is chiefly due to that of his organism, and that of his intellect is partly occasioned by losses of energy during its transformations from that of his food to that of his judgments. During sound sleep none of his actions or surroundings excite his sensorium, and during his waking state the greater portion of them are not perceived. He requires time to perceive things, because inertia of the organs has to be overcome or

their excitement to subside. Certain periods of time are required to transmit nervous influence to the cerebellum, to feel a sensation, to think an idea, to compare ideas, to form a conclusion, or decide upon an action. It has been found by means of experiments that the period of time required to perform a single act of thought is about a twenty-fifth part of a second. We neither lose consciousness nor regain it all at once; we gradually fall asleep, and we wake gradually from it. Consciousness increases by degrees as our various organs enter into action, similar to motion spreading through a large mass of machinery. We cannot instantly realise all the details of a landscape.

We cannot have all we want, nor simultaneously possess contradictory attributes. In consequence of the smallness of his cerebrum, even the most learned man is unable to fully imagine the infinite, the absolute, or the perfect. He fails to perceive the vastness of the universe, or his own immeasurable littleness or feebleness in it. Of the immensity of time, space, or energy, he has barely a perception; he cannot even realise the idea of a million years, a million miles, or the millionth of an inch. This extreme narrowness of

consciousness entails an immensity of ignorance which affects all our thoughts and actions, and is a source of innumerable "evils." In consequence of ignorance we overvalue trifles which stimulate our feelings, and underestimate great things which do not excite us. A great majority of mankind know very little about their own bodies, and this ignorance largely results in producing disease, shortening human life, and limiting human progress and population.

In addition to the influence of *size* of the cerebrum upon the extent and variety of consciousness, that of its *quality* must be important; because we know that favourable heredity, training, and education tend to produce intellectual ability, refined sentiment, and perception of truth. It is well known that a healthy state of the brain and well-balanced consciousness are necessary to proper conduct. Better quality may more than compensate for smaller quantity and surface of the brain, and a smaller brain may do more good work than a larger one. Great size and surface of brain promote ability by affording a larger receptacle for knowledge, while superior quality accompanies better selection and use of it. Wisdom is a nobler possession than knowledge. Some

persons of very great ability have had very large brains, and some who have possessed large brains have had very erroneous ideas through deficiency of knowledge of truthful principles.

(i) UNRELIABILITY OF CONSCIOUSNESS.

Consciousness, when imperfectly corrected by training and knowledge, is essentially crude and unreliable, and often a dangerous faculty. It is subject to a great variety of illusions, delusions, and hallucinations; thus a stick seems bent when thrust obliquely into water, and the sun appears to revolve round the earth. The human sensorium occasionally sees, hears, and feels things which do not exist, and which are merely illusions excited in it by natural causes, such as habit, expectancy, desire, nervous excitement, etc. Thus we occasionally hear our alarm clock ring, or a knock at our bedroom door, when they do not really occur; or a man whose leg has been cut off still feels sensations of his toes. We all of us suffer more or less from uncorrected feeling; and the number of human errors, delusions, illusions, failures of memory, accidents and crimes, due to untrained consciousness, is immense. The frequency of

disordered consciousness is shown by the great number of lunatics. The only fundamental remedy for these "evils" is discovery and diffusion of new knowledge.

Consciousness is largely modified by our dual anatomical structure, especially by that of our chief nervous ganglia; the human organism is largely double; its limbs and most of its internal organs are in pairs. The sense organs, brain, cerebellum, and spinal cord are each divided vertically into two similar organs or halves, and in each case the single organ or the half one usually acts in place of, supplements, or corrects, the actions of the other; thus a man, having only one lung, kidney, or leg, may live. We can hear better with two ears, and see better with two eyes, than with one. Similarly, we feel and think more fully and correctly with the two halves of the sensorium and cerebellum than with one, provided they are alike and healthy; and it has been observed that "persons suffering from disease of one-half of the brain only, often lose the power of comparing and reasoning correctly." In consequence of the duality of its nervous system, "the chameleon is able to allow one side of its body to lie torpid in deep sleep, while the other side is perfectly

awake"; and as its two eyes and optic lobes can act independently, it is able to look in opposite directions at the same instant.

Discordant action of the two halves of the human brain largely affords an explanation of the peculiar phenomena of the "second self," double consciousness, and somnambulism. The cerebral hemispheres are not always alike in size or condition; in some cases one is diseased, or is at intervals stronger or more excited than the other. In consequence of this occasional unbalanced power of the brain the individual is at one period governed more in his thoughts and actions by one hemisphere than by the other, and at other periods the reverse; and his conduct is inconsistent.

The consciousness produced by comprehensive ideas is often less exciting than that due to small personal matters, because the feelings are not involved, and because the greatest truths are frequently inconspicuous. While it is the noisy, violent, and sudden phenomenon which most excites, it is the long-continued, incessant, and feeble ones which ultimately produce the greatest effect; and small habits, by long continuance, form human character. It is similar throughout inanimate nature: given unlimited time, the

smallest cause produces infinite effect. Thus mountains are washed away by mere drops of rain.

Our unnoticed bodily changes bring us gradually to death. Multitudes of persons die prematurely, or become insane, by the slow progress of insidious disease, and this is one of the ways by which the powerful influences of nature limit the world's population. We exaggerate the effects of alcoholic over-drinking because they are so palpable to our consciousness, while we minimise the more serious ones of over-eating because it requires more intellect to perceive them. In various ways we live in a state of false security through the narrow limits of our sensorium and consciousness; thus national decay is so slow that many persons doubt its existence, or only perceive it after it has greatly advanced. As we are largely compelled to be ignorant by circumstances and by our limited consciousness, we cannot be fully expected to believe or understand the greatest conclusions of science, and hence we find many persons quite impervious to important scientific truths. In the midst of all this, the painful effects of ignorance compel us to seek knowledge; but even in producing new impressions on our

sensorium by means of scientific research, we do not actually create new knowledge, but only evolve it out of the evidence existing within and around us; and had we sufficiently extensive and comprehensive faculties, we might reliably predict all that will be from all that is. We already do so in the subject of eclipses and others. Successful prediction is the most certain test of truth.

(j) GENERAL BASIS OF CONSCIOUSNESS.

Consciousness is manifestly based upon the actions of the senses. The senses are founded upon the mechanical, physical, chemical, and vital properties of their organs, and are intimately related to the great scientific principle of universal natural causation, the ever-present conditions of time, space, and motion, and to all the modes of motion known as heat, light, electricity, radiation, etc. We are conscious because our sensorium and our organs of sense move, and they move because their excitants move; and the stronger the movements of the excitants and of our senses, the greater usually is the degree of consciousness. We perceive things because they act upon and move us, and we move because we perceive; we are painfully moved by witnessing

distress. Throughout nature motion is not created, but only transferred, transformed, diffused, or stored up. The only cause of motion is some previous motion, and so on without end so far as we know; that which has no motion cannot move our senses nor our muscles. Human consciousness is excited by the same universal motion which incessantly moves all inanimate bodies. All life is motion, and the only way to keep alive is to keep in motion; when we fall asleep we lose movement, and are less alive. Heat is a species of internal motion, and the human body produces about three times as much heat during the day as during the night, when we are not conscious. All light, heat, and sound are vibrations; they affect our consciousness even when they appear to be uniform.

(k) RELATION OF CONSCIOUSNESS TO
CAUSATION AND MOTION.

The relation of consciousness to motion and to change of motion is very profound; the fact that exclusion of light and sound quiets the brain proves that cerebral movement is intimately related to them. Similar to every other action of material substances, con-

consciousness is inseparable from universal natural causation—*i.e.*, it always happens a minute period after its immediate cause ; and this is owing to inertia of the sensorium, etc., having to be overcome. To arouse it, a movement must be sufficiently fast, but not too rapid ; thus, the movement of the hour-hand of a watch is not immediately perceptible, and that of a very rapidly revolving axle is also not perceived. Simple, unvarying motion has but little effect upon our sensorium ; it is only when some sudden change of motion (which is itself a movement) occurs within or around us, and produces an alteration in that organ, that consciousness happens. A mother wakes when her infant cries, but a miller wakes when his mill stops ; we only know two new shillings from each other when we can detect some slight difference between them. Very uniform influences make but little impression upon our consciousness ; thus, we cannot directly perceive the existence of time or space, the great velocity of the earth in its orbit, nor even the influence of atmospheric pressure or of gravitation upon us ; and we only know, with certainty, of their existence by comparing impressions and drawing inferences from

their differences. A perfectly uniform electric current is but little perceived ; while even a feeble one, if slowly intermittent, produces a strong sensation. Suddenly varying, strong light also strains the sensorium. An electric current varying, with immense frequency, in opposite directions, as in Tesla's experiments, but little excites the sensorium, because each successive opposite wave neutralises the effect of the immediately previous one before the inertia of the nervous matter has been overcome. The inhibitory effect of opposite phenomena upon each other is universal, and indicates the essential mechanical nature of all action, whether conscious or unconscious.

The very foundation of consciousness, and of all human conduct, whether conscious or unconscious, moral or immoral, lies deep in the movements, properties, and capacities of bodies. All our actions, whether bodily or cerebral, appear to be capable of being represented as in harmony with a perfect mechanical system ; and parallels of all of them may be found in mechanics ; but the labour of showing this clearly would be great. The neutralising and conflicting effects of opposite movements of masses or molecules

upon each other are essentially similar to the inhibition of feelings and ideas by contradictory ones. If all material bodies were perfectly alike in properties, they would have very little effect upon each other; but as they are all different, and as no two men are entirely alike, there is continual conflict. It is differences of conscious impressions and ideas that largely keep mankind in motion, and which cause collision between the advancing and retarding sections, the intelligent and the ignorant, the scientific and sectarian; and we know that bodies moving at different rates or in different directions cannot remain united.

(1) RELATION OF CONSCIOUSNESS TO CHEMICAL ACTION.

That consciousness is within the domain of scientific experiment is proved by the fact that it can be increased, decreased, or destroyed by various natural agents; thus alcohol, strong tea, quinine, strychnine, or rise of bodily temperature increases it; chloroform, morphia, chloral, trional, etc., decrease it; while a small quantity of prussic acid or a concussion of the brain destroys it altogether. Great thirst or cerebral inflammation produces intense consciousness. That it is intimately

related chemically to the oxygen dissolved in the arterial blood of the brain is shown by the circumstances that during excitement of mania there is great oxidation and waste of brain, the products of which, in form of phosphates, are found in the urine. The rapid waste of brain, also, during deep meditation limits the duration of our power of attention. One of the methods of reducing consciousness is by diminishing the oxygen in the circulation; thus, many animals promote sleep by covering their noses and breathing the impure de-oxygenised air from their lungs. The circulation of duly oxygenised blood through our arteries during the waking-state is a constant cause or condition of feeling, thought, and action. The great fact that consciousness is dependent upon many natural conditions proves that it is itself natural; and we are not morally justified in fixedly believing, without evidence, that it is supernatural.

Further, there is a systematic order of relation between it and other natural phenomena. Thus, the sense-organs are evolved out of material food by vital processes, the senses out of the particular structures of those organs, consciousness out of the senses, com-

parison out of dual acts of consciousness, and inference and reasoning out of comparison. During this series of changes the stored-up energy of food is transformed into vital energy of the sense-organs, that into the energy of the senses ; the energy of the senses becomes that of consciousness, and that of consciousness turns into that of reasoning-power through the medium of comparison, which is itself essentially dual perception. In this order energy of intellect is produced, and some heat is lost during the process.

(*m*) SENSORIAL IMPRESSIONS.

The sensorium is a storehouse of memory and an incomplete register of our pains and pleasures. The latent impressions made upon it are fixed by repetition and habit, ready to be revived by associated ideas, and by the oxygen dissolved in the blood. Much of our happiness and misery depends upon these imprints ; if they are untruthful, they are liable to produce pain, because they contradict each other, and those persons who have a mixture of truthful and untruthful ones often do not know what course to pursue.

Multitudes of persons suffer in this manner, and are driven to seek consolation in irrational

hopes and unprovable ideas by the clamour of their desires. Under the influence of cerebral excitement and memory malicious persons are rendered liable to suffer from uncontrollable malicious dreams and ideas, and in some cases have even committed murder and suicide while under their influence. The foregoing and a multitude of other "evil" effects due to unregulated consciousness show the necessity of truthful ideas, proper food, pure air, judicious exercise, and pure blood to healthy consciousness. It is well known that gout makes the sensorium irritable.

(n) DEPENDENCE OF MORALITY UPON
CONSCIOUSNESS.

The relation of consciousness to morality is very extensive. "As we feel so we act," unless intellect prevents it. All moral acts are conscious ones, and the conscious state is a requisite condition of all moral action. We are not considered morally responsible for acts performed by us while we are unconscious, nor even for those we commit during dreams or somnambulism, nor while we are insane. The compulsory influence of natural causes is usually recognised in such cases; but how far a person is allowed to injure his fellows,

even when compelled to do so by internal or external circumstances, differs in every different case and depends upon a variety of conditions. Our feelings compel us not only to commit "evil," but also to resist it.

Simple automatic consciousness, uncorrected by knowledge and inference, is frequently a great deceiver. Thus we often wrongly estimate magnitudes, numbers, distances, periods, volumes, and weights. We make mistakes with regard to existences, events, persons, forms, colours, and appearances, and this gives rise to innumerable false beliefs, lawsuits, sectarian and political conflicts, wars, diseases, accidents, and crimes. Our senses and feelings afford us a mixture of truth and error, from which we have to sift the truth by means of experiments, comparison, inference, and analysis. The actions of all our limbs, organs, and faculties are similarly more or less unreliable, and even our most highly corrected scientific knowledge is frequently only approximate. We are all of us in different degrees "blind leaders of the blind," and a large proportion of the pains we suffer and inflict is due to the circumstance that we are kept in ignorance by our very limited powers. Similar to moths

flying into the flame of a candle, so we are compelled by our instincts to hasten unknowingly towards disease, insanity, crime, and death. Untruthful consciousness misleads millions, and we are compelled by natural influences to expend much of our time in elaborating and diffusing untruths and illusions, and but little in discovering new knowledge.

(o) DEPENDENCE OF BELIEF UPON
CONSCIOUSNESS.

Consciousness and belief are closely allied : as we feel, so we usually believe, especially in difficult subjects. Internal and external influences cause our feelings, and these, with or without correction by intellect, determine our opinions ; we cannot always stay to investigate. The great advantage of consciousness in causing us to believe and act is its quickness, and that of intellect is its greater reliability ; it needs more time to reason than to feel, because reasoning requires us to compare two or more feelings or impressions. Consciousness alone produces only blind belief, but reason produces reliable conviction. As reason is frequently weaker than feeling, it is our higher faculties rather than our lower

ones which most require stimulating. Consciousness is fallible because it does not compare its impressions, but acts immediately upon them. It determines our conduct more frequently than our intellect, because it acts wholly automatically ; but when it has been properly trained it is often our best guide, and produces similar results. Automatic consciousness is like a "ready reckoner"—it saves us the trouble of calculating.

Reason, however able, cool at best,
Cares not for service, or but serves when prest ;
Stays till we call, and then not often near ;
But honest instinct comes a volunteer. —*Pope.*

(p) LIMITED SENSITIVENESS OF HUMAN CONSCIOUSNESS.

Our senses and consciousness are very dull in comparison with inanimate agents. A wave of light travels 700,000 times faster than one of nerve-energy ; a photographic surface detects thousands of heavenly bodies which we cannot see even with the aid of a telescope ; a bolometer is estimated to be about 200,000 times more sensitive to heat than our skin ; a galvanometer can show the influence of one part of chlorine in 500,000 million parts of water, while our taste cannot with certainty

distinguish one part in a million ; a photograph is a much more extensive, minute, and certain record than our brain ; and even the process of reasoning can be mechanically performed by means of Jevons's "logical machine." We depend very largely upon the properties of scientific appliances for our beliefs. The microscope, spectroscope, telescope, photography, the kinematograph, etc., have brought a new world of impressions into our consciousness. And as such instruments, processes, and methods are free from personal prejudice, and vastly surpass in delicacy and reliability our senses and perception, it appears highly desirable that they be used for testing the idea of telepathy and the hypothesis of the existence of human spirits in space.

(g) RELATION OF CONSCIOUSNESS TO
TRUTHFULNESS.

The relations of the sensorium and consciousness to truthfulness are of a most practical kind. Immovable false beliefs, fixed impressions without evidence, and ignorance or lack of cerebral impressions, are dangerous, and contradictory ones destroy peace of mind. As the sensorium of criminals and insane

persons is moved and governed by the same natural influences and laws as those of the wisest men, we are all of us compelled to believe, more or less, untruth, and are largely unable to get rid of false impressions. Consciousness includes both truthful and untruthful impressions. We often believe, though we cannot really know, that which is untrue; and without proper and sufficient evidence we cannot with certainty know anything. The properly trained sensorium can contain a much larger number of impressions than the untrained one, because its impressions do not contradict each other, and are systematically united together by truthful principles. The phenomena of false belief, unprovable belief, belief without evidence, delusions and illusions, belong to the subject of mental disorders; and the question as to how far we are morally justified in believing serious statements without evidence, or believing and diffusing unprovable statements in such matters, belongs to the subject of scientific morality. The moral duty of improving our minds by receiving the truths of science is already to some extent recognised. The hopes of the human race depend largely upon scientific correction and extension of

consciousness. The discovery of new knowledge is the starting-point of human progress ; and as the possession and application of great truths is the chief remedy for the pains and "evils" of life, original scientific research is a very practical matter ; but the process entails a vast amount of labour.

As consciousness and all our other faculties are so extremely limited in comparison with the contents and powers of the universe, it is not surprising that only a few persons can fully realise the idea of universal natural causation, or "whatever is must be," under all the conditions and circumstances, and, consequently, the necessity of crime, "evil," and conflict. In the continual presence of so much pain and misery in nearly all directions, it is almost beyond human power to even faintly imagine the still further truth that "whatever is is right"; yet both these conclusions must be come to if we scientifically and thoroughly examine the subject.

The chief claims of the foregoing "view of consciousness" upon our attention are: It agrees with the principle of universal natural causation, and with all well-verified knowledge ; it involves no real self-contradictions ; by its agreement with these, and by its self-

consistency, it gives us confidence in the natural powers which govern us, and imparts greater confidence, courage, and carefulness to all our thoughts and actions ; it affords us consolation by showing that our trials, if properly accepted, are often our greatest blessings ; and, by its truthful explanation of the real cause of the shortcomings of mankind, it makes us reasonably tolerant towards all men. But as this view is a comprehensive one, it cannot be accepted, nor its advantages secured, without the labour of acquiring sufficient suitable knowledge.¹

¹ This essay appeared in *The Monist*, April, 1905.

V.

A SCIENTIFIC SKETCH OF UNTRUTH¹

THE chief object of this essay is to show untruth in its general relations to scientific principles ; its origin, necessity, utility, justification, and limitations ; how it arises in the human brain, and how it affects human progress. In previous publications I have submitted views on kindred subjects, and I have adduced evidence to show that the rudiments of our thoughts and actions can be traced down and merge into the properties and changes of the material elements of which we and our environments are composed. In consequence of the complexity and comprehensiveness of the subject, the present article requires attentive reading.

(a) GENERAL SCIENTIFIC RELATIONS OF UNTRUTH.

By the terms "truth" and "knowledge" I mean ideas which are consistent with all

¹ From *The Monist*, January, 1906.

conclusions properly drawn from them ; and by "untruths" I mean statements which are not consistent with facts. That is not knowledge which is not true. It is a strict rule in real science to limit belief to the evidence, and to exclude all inconsistent ideas, otherwise discoveries could not be made, and truth could not be attained ; but our mental faculties are so weak, and our lives are so short, that in ordinary affairs this rule is often disregarded. The human brain also is so constituted that it retains almost any impression, whether true or false, which is strongly made upon it, and we therefore often believe, though we do not really know, that which is untrue. The mere antiquity of a belief is not a proof that it is either true or permanent ; the ancient one, that the sun moved around the earth, is an example.

Next to life itself, truth is our most valuable possession. As mere belief is often treated as truth, multitudes of persons are willing to suffer almost any pain for the sake of their beliefs, whether true or false ; and under this influence many have sacrificed their lives as martyrs, missionaries, explorers, and discoverers. The chief explanation of this fact is that a strongly-fixed cerebral impression is

part of the nervous structure, and, like a mark of small-pox, is constantly renewed as it wears out. The strength of some fixed beliefs is so great that under their influence thousands of innocent witches and heretics have been slaughtered and burned alive by believers in unprovable dogmas. In consequence, also, of the incessant action of our environment upon us, our love of pleasant falsehoods is so strong that new ones are frequently invented to gratify us. The extent to which we accept and practise untruth indicates the degree of uncertainty of our ideas and the limits of our love of truth.

As truth and untruth are ideas almost wholly confined to human beings, they are only manifested by an extremely small portion of nature ; but they seem large and important to us, because they affect us so personally. Science has proved that we are mere specks of matter in the cosmos, animated by its all-pervading motion ; we come and go, but the world continues, and we only possess anything for a lifetime, a mere speck of eternity. Each man perceives only a very minute portion of nature, and understands immeasurably less ; and the more ignorant he is, the more familiar he assumes to be with the greatest mysteries.

The comparative unimportance of man in the universe is shown by the extent to which he is sacrificed by great natural actions, such as earthquakes, volcanic outbursts, hurricanes, diseases, etc.

The human brain is only partly developed, and our intellect is so weak that in nearly all complex questions, such as that of morality, we are often compelled to guess conclusions, and this is especially the case in apportioning punishment or reward. The extreme feebleness of our senses and reasoning powers, even with the aid of scientific appliances, limits nearly all our ideas. There is, consequently, a maximum of knowledge beyond which we cannot attain, and all additional unknown truth is to us an infinite void. A photographic surface is in this respect similar to the human brain, in that all beyond a small portion of the solar spectrum makes no image upon it, and is to it an entire blank. Further, as we estimate nearly all things by our own little selves, the pains we endure prevent our taking a true view of our position in nature, and the immense amount of human misery around us blinds us to the fact that untruth and pain are largely necessary to human progress and development. In addition

to the very limited power of our intellect, and the inconceivable vastness and complexity of nature, nothing is fixed, final, or quiescent; all things are moving, our mental condition is always changing; and it is largely in this way that many inquirers after the truth, especially in psychical questions, are baffled in their researches: they cannot realise all the possibilities of error. Varying degrees of probability also limit all our thoughts, and we cannot venture safely beyond them.

In addition to these causes of untruth, very few persons think alike except in well-verified science; there are also two or more different aspects of every moral, social, and political question. It requires broad views as well as narrow ones to get through life safely; the narrow view is—"this is a wicked world," while the broad one is—"whatever is must be, under all its conditions and circumstances." Nature is full of seeming contradictions, but has no real ones, and we are compelled by our environments to believe both truth and untruth. Our capacities of receiving truth and untruth depend largely upon the properties of our nervous system; thus, dulness of the senses considerably prevents cerebral

impressions. In interpreting such impressions we are usually actuated more by feeling than by reason, because our environments act first upon the senses, and only through them upon our intellect, and power is lost in the process. Our feelings are our first guides, and act automatically. We imagine both truthful and untruthful ideas spontaneously to a very large extent; and there are many persons who live almost entirely automatically, without the help of much knowledge or intellect. It is not so much because an idea is true or false that we fail to accept it, but because the brain is unprepared to receive it, or because it contradicts our previous ideas and confuses us. The ability to receive truth depends largely upon the kind and amount of knowledge already possessed. Thus, he who does not know the alphabet cannot read; similarly, unscientific persons cannot readily accept the scientific basis of morality.

Notwithstanding that untruth is regarded as a species of "sin," to be "stamped out by means of religion," do what we may, we cannot prevent our environments producing it, nor alter the principles upon which the universe and mankind are governed, and

which lie at the root of the matter. The only effective preventive of untruth is the gradual discovery and diffusion of truth ; and this can only take place at a very slow rate, because rapid improvement of human beings is more than they can bear.

An extensive examination of books and articles in reviews, etc., on moral and theological subjects shows that the entire topic of "untruth," "sin," and "evil" remains even now a tangled mass of vague complex statements which no man can clearly understand. Nearly all such publications are largely written as if the fundamental powers and principles of science have no existence and exert no influence upon man's moral ideas or actions. This is largely due to the difficulties of the subject, and to our feeble apprehension of fundamental science—a special professorship of the chief principles of science in each university might perhaps help to remedy this omission. To live without adequate knowledge of the powers which govern the universe and mankind is largely to "live without God in the world" ; but we have little choice in the matter.

In some exceptional cases even clever

they attempt to harmonise science and dogma. Thus Faraday, when asked how he could believe theological doctrines inconsistent with science, replied: "I prostrate my intellect." It is, however, a conspicuous fact that nearly all of the thousands of able scientific discoverers have avoided such subjects, largely because of their confusing nature, and especially because of the great number of untruths and inconsistencies associated with them. The attempt to harmonise science and dogma is nearly always a failure; and while we may consider unproved statements as such, in order to test them, we cannot with safety fixedly believe important ones without proper and sufficient evidence, and if the evidence is insufficient we must wait for more.

Inconsistency is a degree of untruth, and often a first sign of insanity. No man can believe in dogmas, miracles, ministering angels, the existence of spirits in space, life or mind without matter, etc., and at the same time in the fundamental principles of science, without suffering cerebral confusion, because the two sets of ideas are contradictory. A proof that the methods employed by scientific discoverers—viz., experimental observation, meditation, and inference—are reliable, and

those used by supernaturalists are not, is the fact that, while tens of thousands of new truths have been found by means of the former, few or none have been evolved by the help of the latter. The great failure of untruth as a means of discovery does not, however, prove that it is useless or entirely unjustifiable.

(b) THE ORIGIN OF UNTRUTH.

Of what is termed the "first cause" of truth or untruth we know nothing, simply because it is beyond the limits of human power.

Heaven from all creatures hides the book of fate ;
All but the page prescribed their present state.

—*Pope.*

Any natural action, such as a thought, is only one in an infinite series of events, and our perceptive power is altogether too limited to enable us to trace our ideas back to a "first cause" in the infinite past. The deepest cause, both of truth and untruth, so far as we can at present trace it, is the universal motion within and around us, which is always acting upon our cerebrum and producing impressions. Physicists well know, from the phenomena of astronomy, spectrum-analysis, heat, etc., that all substances, whether living or

dead, are in this state of perpetual and indestructible motion, and that this motion acts upon all things by means of radiations through the ether. It acts upon men, and compels each man to influence his fellow-man, and his fellow-man to influence him.

The origin of untruth depends further upon the fact that all bodies, whether living or dead, have but limited powers, and that the intellect of man can only imperfectly distinguish truth from error. This human feebleness is largely due to the small range of the senses, the immensity of the universe, and the almost infinite complexity of nearly everything in it. The smallest irregularity or weakness of action of the senses or intellect also produces false ideas, and it is largely in this way that untruth and "sin" enter the human brain. A multitude of untrue impressions arise from the circumstance that we magnify the importance of everything we feel, and pass unnoticed the greatest of truths if they do not affect our consciousness. Even the life-supporting substance, oxygen gas, was not discovered until the year 1774.

It is well known that truth is mingled with untruth in every person; but it is not so obvious that the essential source of each—viz.,

the impressions produced upon the brain by the motion of its environments—exists in itself. The result produced is either truth or untruth, according to the kind of cerebral impressions made and of those already present. If the incoming ideas are true and the brain is properly prepared, truth is received; but if either the new ideas are false, or the brain is unprepared, untruth is produced. Many impressions are made upon our brains without our perceiving them, and are occasionally revived in our dreams. They are often untrue, because our intellect is not sufficiently awake to correct them. In consequence of differences of perceptive ability and of existing impressions in different persons, that which appears true to one person often seems untrue to another; thus the dogma of the "Immaculate Conception" appears true to Roman Catholics, but is utterly false to physiologists and scientific men generally.

The reception or rejection, both of truth and of untruth, is largely dependent upon the intellectual state of the brain. Thus, boys and girls are not admitted into higher-grade schools if they have not been properly prepared in lower ones. Similarly, the brain of

each person must already contain a sufficient number of true ideas suitable to correct the incoming ones by means of comparison and inference. It is largely through deficiency of truthful impressions and of suitable training that ignorant persons are frequently untruthful. The universe is infinitely truthful, and the chief sources of untruth are in us. The greater the number of important truths we know, the smaller, usually, is the proportion of untruths we believe, because each important truth corrects and weakens some untruths. We are immersed in an unlimited ocean of mysteries, and, in consequence of our very limited faculties, we believe a multitude of untruths respecting them.

The reception and rejection of truth and untruth are also dependent upon sensation and feeling. As our environments act first upon our feelings, and only secondly upon our intellect, the way we receive our impressions is usually decided by the feelings: if these are pleasant they are accepted, and if painful they are rejected. The ordinary automatic excitement of our brains, uncorrected by evidence and intellect, is a great source of untruth. Thus, we spontaneously imagine all kinds of false ideas. We fancy

that we are stronger than nature, because of our numerous discoveries and inventions, forgetting that it is the energy of our surroundings which causes us to make these discoveries, and that nature has vastly more power over us than we have over it. We imagine that a "spirit" or an "ego" within us draws our conclusions, while the fact is our conclusions are produced by the influence of the evidence and of our feelings upon our intellect, the cerebral impressions automatically causing the inferences by the aid of comparison. We fancy that our volitions are due to the "ego," not thinking that they may be produced by unobserved stored-up cerebral motion. It is only by automatic action and reaction, accompanied by transference of energy, that we, to a small extent, "govern nature" by our volitions. Similarly, in our ideas of "choice, selection, and self-guidance" we overlook the fact that we are automatically compelled to perform them. It is well known that metals automatically "select" particular metals from mixed metallic solutions, and that crystals automatically "choose" pure ingredients from impure saline liquids with which to build up their structures; and, therefore, a mysterious "power" is not necessary to

perform the same kind of work in us. Energy is always stored up in us from our food, and liberated under suitable conditions; and the so-called "soul in atoms" and "mind in plants" are probably different modes of motion in those different bodies. Neither the sun nor universal energy is a "divinity," simply because it guides and governs terrestrial and heavenly bodies.

Some persons believe that "ministering angels" and beings of a higher order than man surround us, that vitality exists independent of matter, that space is tenanted both by human ghosts and vital ones, by spirits of dead plants and animals; but we do not possess satisfactory evidence to prove that these ideas are true; and such beliefs would be prevented by adequate knowledge of physiology. The radiation images emitted by substances, and which travel 186,400 miles a second, cannot be permanent spirits, because they are transformed, and cease to exist when they fall upon other bodies. Another common error is that human thoughts and actions are "guided" by some "spiritual power" outside them; but the discoveries made by Newton, Joule, and others, of the planetary movements especially, have largely

proved that the universe is a self-guiding machine. That the energy in each act of change passes automatically from one substance into another, and is altered in its form in the process, but without perceptible loss or gain in total amount; therefore, there is no work left for "spiritual power" to perform. Such spiritualistic hypotheses are too complex and vast to be proved by mere human observation alone; they require a variety of well-verified evidence. Nothing less than the incorrupted testimony of inanimate substances, such as are employed in physics and chemistry, would be sufficient to fully justify us in firmly believing such important and extraordinary statements; and we must wait patiently for such evidence respecting them as Newton waited for Picard's measurements to prove the truth of the law of gravitation. The number of variety of forms in which untruth automatically arises in the human brain is practically endless, but the instances given are sufficient.

Suitable knowledge of science enables us to detect the rudimentary causes of nearly all our chief actions in plants, and even in minerals. Magnets and metals show distinctly the rudiments of heredity and of memory,

and crystals show those of "choice" and "volition." Man is not the only deceiver; many other animals deceive; and although inanimate bodies do not actually utter untruths, their properties and actions suggest them. Thus the sun, during all ancient time, appeared to revolve round the earth, until astronomers discovered the deception; and the weather is notoriously deceitful. The rudiments of various "moral and immoral" qualities in plants have been described by J. E. Taylor in his book on *The Sagacity and Morality of Plants*. The statements made respecting the existence of "souls in atoms" and "mind in plants" are largely instances of incorrect nomenclature. Calling things by false names is a common practice, and energy is not "mind" simply because it is motion.

Untruth is often an immediate result, either of ignorance or design. Many serious untruths have been invented and promulgated at different periods. Those of the existence of a "heaven," a "hell," a "devil," and "immortality of the soul" are very ancient; that of "transubstantiation" was invented in the ninth century, that of the "Immaculate Conception" was made an article of faith in

1854, and the "Infallibility of the Pope in faith and morals" was decreed in 1870; while some persons even now venture to assert that "the value of a single soul is infinite." Untruth is greatly promoted by human conceit; in consequence of the incessant action of our environments upon our senses and feelings, the importance of everything human and personal is exaggerated. Thus we consider that "the universe was made for man," while it is incomparably more true that man is merely a denizen and an extremely minute fraction of this little globe. It is altogether beyond human power to adequately perceive its own littleness in the cosmos. The universe is one of truth, and the cause of our inability to truly explain it lies largely in us; we are simply deceived because we are ignorant. It is chiefly in consequence of the inconsistency between ordinary narrow views and comprehensive scientific ones that the entire subject of "sin and evil" is a vast paradox to unscientific persons.

(c) THE JUSTIFICATION OF UNTRUTH.

Absolute compulsion justifies all things, even the immense destruction of human beings

by great terrestrial catastrophes, epidemics, etc.; and no exceptions are made in favour of men, whatever their sufferings or beliefs may be. The supreme question throughout nature is, not what is most truthful or pleasing to mankind, but what is most necessary to the well-being of the universe; and everything yields to this. The first effect of universal natural energy is to preserve the cosmos, and this is the greatest good, because all other good things depend upon it. If this world was destroyed, all mankind would perish with it.

The first Almighty Cause
Acts less by partial than by general laws.

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Better for us, perhaps, it might appear,
Were there all harmony, all virtue here;
That never air or ocean felt the wind,
That never passion discomposed the mind;
But all subsists by elemental strife,
And passions are the elements of life. —*Pope.*

With every living thing there is action and re-action; life is a struggle and a conflict. The fox gains a living by means of deceit, and the incomes of many men and women are largely secured by means of untruth and unceasing competition.

The strongest power governs in nearly all cases; the stomach must be fed before the

intellect, because it is the stronger influence. Our most pressing question usually is, not what is true, but how can we live and enjoy life. We are primarily governed by infinite energy, and our thoughts, whether true or untrue, are as necessary consequences of natural powers as the actions of inanimate substances. We possess no full proof that an act of thought is in any case an exception to this, but we have abundant evidence to show that our ideas require expenditure of natural energy to produce them. The formation of each truth or untruth in the brain is attended by loss of heat. Each single idea also arises out of its immediately preceding cause, in accordance with the principles of continuity and equivalency of energy. We all think and act as we are compelled by our environments, and we cannot much prevent them forcing us to believe untruth as well as truth.

An opinion has long been held, though rarely expressed, that there exists some degree of justification of untruth, and this unpleasant conclusion is largely supported by evidence. Thus the simple facts that untruth is a necessary consequence of the action of our environments upon us, and that each man thinks as he is compelled under all his

conditions and circumstances, are alone sufficient to prove some degree of justification for it. The opinion is further supported by the fact that truth and untruth are essentially alike. Thus both are cerebral impressions caused by natural influences ; each is limited by circumstances ; each supplies pleasures and pains, consolations and disappointments ; each is necessary to human progress ; the use or abuse of either is rewarded or punished ; and we justify each so far as we think it does good. There are all degrees of truth and untruth. Each has opposite effects according to its amount, so that, if either is deficient, it does not sufficiently stimulate us to action, and if in excess it excites us too much. Both are governed by the influence of our environments, and are kept within certain bounds by their conditions. A due amount of truth promotes human progress, a deficiency fails to stimulate it, and an excess retards it by producing too rapid changes. Untruth aids progress by exciting conflict and discussion, and retards it by misleading mankind.

There are, however, conspicuous differences between them, and, although these are of very small value in the cosmos, their highly personal effects cause us to feel them

keenly, and to exaggerate their degrees of importance. The chief ones are that truth is reliable, while untruth is not ; truth is a safe basis for thought, prediction, and action, but untruth is always liable to be detected, refuted, and rejected ; we cannot reliably predict future events from untruthful data ; truth leads to new knowledge and scientific discoveries, but untruth does not ; truth is consistent with all known facts, but untruth is not ; untruths are often cheap at the outset, but dear at the end ; while truths are the reverse. Truth is far superior to untruth as a guide of life, and as a consolation in times of distress, because it is trustworthy and unalterable. It is, however, much more difficult to obtain. The reliability of a man's word is largely proportional to his freedom from untruthful beliefs, because they prevent the reception of truth ; and to his knowledge of the great principles of science, because they are the chief tests of truth and error. True views of nature and of human conduct yield the most permanent happiness. It is largely in consequence of deficiency of such knowledge that untruths are believed and propagated by many of the kindest men. Truth is the best stimulant to self-improve-

ment. The acceptance of it is largely a question of education and training, and of how much self-sacrifice and labour a person is able to bear. While truth imparts courage and self-reliance, the uncertainty of untruth weakens all our powers. While too much truth is more than ignorant persons can comprehend, too much untruth is more than intelligent ones can bear ; whence arises continual conflict between these two sections of mankind.

Untruths are fundamentally mere temporary expedients in the evolution of man. They are often unhealthy and a first step to insanity ; and, as untruthfulness often leads ultimately to suffering, we should be as careful about what ideas we accept as we are of what food we partake, and adopt similar general rules in accepting them. In consequence of untruth and ignorance, millions of persons are annually led into disease, misery, crime, insanity, and early death ; and it is only on acquiring sufficient knowledge of the chief powers and principles which govern the universe, and referring all questions to them for explanation, that untruth can be prevented from entering the human brain. Untruth is not accepted if we are trained

and possess, in advance, the knowledge necessary to correct it. But to entirely prevent it is impossible, because that would require unlimited knowledge ; the utmost we can do is to correct and slowly diminish it. As all our attempts at avoiding it are extremely feeble in comparison with the magnitude of the task, we go on much in the same way from one generation to another. All mankind cannot be suddenly made truthful ; and even if they could, each generation would still require teaching afresh. Belief in untruths generally must continue as long as mankind remains ignorant of the chief principles of science. Untruth, conflict, and strife are inseparable from human life. Conflict is a result of motion ; the whole of nature exhibits it. Thus, waves beat upon rocks and wash them away. All nature appears deceitful, but the real source of deception is usually the feebleness of our faculties.

Notwithstanding its drawbacks, untruth is a cosmic and human necessity. It is necessary as an element in the general evolution of man. We are in a state of gradual development, and require some stimulus to compel us to change. Truths and untruths, pains and pleasures, stimulate us ; they strengthen

us if accepted rightly and are not too great for us to bear, and weaken us if in excess. The facts also that untruthful expressions are produced by the same natural process as truthful ones, and exist in accordance with the law of universal causation, are alone sufficient to prove their necessity. There exists some degree of virtue even in untruth, but our views are so narrow we can hardly believe it. Thus, in common with other kinds of "evil," it is useful as a regulator of human progress. As deadly poisons, such as arsenic, prussic acid, and strychnine, are sometimes necessary to relieve disease of the human body, untruth may in some cases be necessary and justifiable to relieve distress of the mind. Through lack of knowledge and courage we frequently consider pain and untruth to be "evil" when they are not. The idea that truth and untruth are really evil when they produce pain will not bear examination; the universe does not exist merely for our pleasure, but we exist to obey omnipotent power. A large portion of the pain of life arises from our ignorance and false ideas, and another from great natural causes over which we have little or no control; and all the animals have to submit to it.

According to the widest scientific knowledge, "whatever is is right"; but according to ordinary narrow ideas "this is a wicked world," and "there is something wrong in everything." But even this dissatisfaction is useful, because it excites discussion and stimulates change and progress. Untruth is only one form of a multitude of actions we term "evil." But according to science all these actions, ranging from the greatest physical catastrophes to mere exaggeration in men, are ultimate results of physical powers, and men are as perfect as the fundamental properties of the bodies of which they are composed allow them to be. Man is not imperfect because he is complex; a complex ocean steamer is as perfect as a simple sailing ship. Nor is he "sinful" because he is weak; his "sins" and the actions within and around him arise out of the facts that all substances and creatures act, or fail to act, upon each other, according to their natural properties.

Then say not man's imperfect, heaven's at fault;
Say rather, man's as perfect as he ought. —*Pope.*

And that when all is known and all is understood, mankind will see "whatever is is good," and that universal energy, acting through

man, is working out his destiny by means of untruth and of truth.

Untruth has often more adherents than truth in complex subjects, chiefly because false explanations are frequently more pleasing or easily understood than true ones; and the question what is justifiable in any complex case is never finally settled to the satisfaction of all persons, simply because very few persons think alike on complicated subjects. Nearly all persons practically support, by their conduct, the conclusion that untruth is more or less justifiable. The amount of pleasure and stimulus afforded by it in tales, novels, plays, poetry, suggestive music, oratory, sermons, allegories, metaphors, dogmatic beliefs, miracles, pseudo-science, etc., is immense—the popularity of *Bunyan's Pilgrim's Progress* and *Robinson Crusoe* supplies familiar examples. And the consolation afforded by theological dogmas to millions of persons in distress or near to death is abundant proof of its immediate utility, whether it is fully justifiable or not. The chief explanation of these facts is that we are largely compelled to tell untruths by the influence of circumstances upon us, and because it is often a habit or personal advan-

tage. It is of great use in helping us to acquire money, social influence, popularity, and success. A vast amount of it is employed in nearly all occupations—in trade, manufactures, literature, social appearances, sectarian teaching, etc. It has been used to an immense extent in all ages to satisfy the almost universal desire for pleasure. Even the prophet Jeremiah is reported to have said: "The prophets prophesy falsely, the priests rule by their means, and the people love it to be so." And as untruth is so useful, it necessarily continues. Most persons tell untruths spontaneously—as far as they think it is for their advantage, as far as they dare, and as other persons allow them; and all are more or less occupied in defending themselves from the untruth and deceit of their fellows.

The same universal energy which produces changes throughout nature compels us to use both truth and untruth in securing a maintenance. As life is and must be our first object, and untruth is so necessary in obtaining an income, we may not entirely condemn those who practise or diffuse it. But there is a limit to its justification, and, while we should be tolerant towards others, we must protect

ourselves from injury, both by untruthful persons and by advocates of too rapid advance. We require to be duly altruistic towards all men and sufficiently conservative towards ourselves. Absolute necessity largely justifies the conduct of a criminal as well as that of the judge who condemns him to punishment. Persons are blamed and punished not so much for their misdeeds as to deter them from doing wrong in the future. The fact that untruth is more or less necessary, justifiable, and good for mankind is one of the many painful truths we have to accept, whether we are willing or not. Similar arguments justify in various degrees all that we term "sin and evil."

The real scientific justification of an act is the degree to which it contributes to the welfare of the cosmos, therefore to that of all men, and not alone to our individual pleasure. The well-being of the universe and "the greatest good" are nearly synonymous, and the noblest object of life is comprehensive utility. There are all degrees of "goodness," and that which does good is more or less good whether it be a truth or an untruth; and the larger the "good" and the less the "evil" produced, the greater is the degree of justi-

fication. But "good in excess is evil," and extreme pleasure is painful. An excess of truth or of pleasure is more than some persons can bear, and much of the cheap goodness extant is hardly worthy of the name. There exist nearly all degrees of justification of untruth, ranging from that of automatic unintentional exaggeration to that of serious manifest falsehood. Such automatic falsehood is very prevalent, is often acquired by habit, and is a frequent sign of ignorance and defective training. But if some persons did not readily exaggerate the importance of money and pleasure, they would not be sufficiently stimulated to obtain it; and if others did not over-value new knowledge, they would not make the sacrifices necessary to discover it, and human progress would be impeded. As also the brains and nerves of different persons require different degrees of stimulation to excite them, exaggeration is in some degree useful. In consequence of our very limited intellect in complex cases, some persons practise expediency, and try to "appear all things to all men"; but even this is a degree of untruth, and has some justification. It is only by faith in the greatest truths that we can be fully justified, and the most final

court of appeal is consistency with all known facts.

How far untruth is justifiable in any particular case depends upon the circumstances, and, as we cannot actually measure the value of these, we are only able to guess a reply, and act upon the degree of probability ; and every different person guesses differently. This difficulty is usually diminished by employing juries, committees, etc., on the rule that "in a multitude of counsellors there is safety." Such cases are almost endless in number and variety, and give rise to continual discussion without arriving at any final conclusion. Justification of untruth is largely a personal matter, which each man must decide for himself and accept the consequences. The practice of untruth, even for laudable purposes, lessens respect, because it shows our feebleness ; and how far it is justifiable to believe and teach unprovable statements in important subjects is a serious question, and requires frequent revision as civilisation advances.

(d) LIMITATION OF UNTRUTH.

The general restrictions of untruth are much the same as those of truth—viz., how much

our environments compel us to accept, and how much we are able to bear. As the properties and powers of nearly everything are limited, this restricts the effect of our surroundings upon us. Too much truth stuns us, too much untruth repels us, and each excites our resistance. The untruthful man does as he must, and his victims do as they must in return, in order to protect themselves and restrain his conduct. The fact that both truth and untruth are kept within bounds by our feelings shows that they are governed and limited by the stronger influence of our environments. Everything limits the action of everything of opposite property. Truth and untruth limit each other; intelligence and ignorance, ditto; the same with science and dogma, and with the advancing and retarding sections of mankind. We cannot simultaneously think of two opposite ideas, and even a Deity could not be infinitely just and infinitely merciful. Both truth and untruth are limited by rules of social conduct; ordinary social life could not be carried on if untruth were too prevalent, or if too much new truth were suddenly made known. If ignorant persons had too great power, there would be no supply of new knowledge and no

human progress ; and if the most scientific had too much control, the labour of self-improvement cast upon ignorant persons would be more than they could bear ; even now millions of persons fail prematurely in the struggle of life. All these phenomena depend largely upon the great fact that every action requires time, and is almost wholly determined for us by natural powers.

Untruth in any subject usually lasts only as long as mankind is pleased or benefited by it. Old habits and false ideas die out ; the dogma of all things being composed of "earth, air, fire, and water" has disappeared, and others are following it ; even the view that the elementary substances are wholly inconvertible is being modified, for we now know that some of them change into others with extreme slowness. The use of truth is restricted in various ways, similar to that of untruth. Thus, it may not be told at all times to all persons, or under all circumstances ; and if it is said with malicious intent, and not for public advantage, it becomes libel. Untruth in cases of perjury is criminal. We must not use either truth or untruth so as to inflict avoidable pain upon others, except in self-protection or defence. Thus, although we may not speak the truth

at all times or in all places, we may give evidence against criminals and confine them in jail, in order to ensure public safety and criminal reform. It is even good in some cases to keep other persons ignorant; thus doctors may not always tell the truth to their patients, lest it may delay their recovery; but they may mention it to their colleagues in consultation. Extremists in truth or untruth nearly always suffer; thus Bruno, Galileo, and nearly all advanced scientific men, have been punished, while very ignorant persons are nearly always in distress. In all these cases universal energy acts so as to secure the greatest "good" to the cosmos, and compels each man to be more or less "a law unto himself"; but "goodness" is largely unmeasurable.

The limitations and restraints put upon the use of truth and of untruth constitute a large portion of the subject of morality, and the natural explanation of each is largely the resistance of those persons who are pained by them. All our ideas are more or less limited by the sect, community, or nation among whom we live; and we may not mention too freely truths which they dislike. We are surrounded by multitudes of circumstances

which compel us to be either more or less truthful or untruthful. The number of untruthful ideas is greater than those of truth, and there are usually more ways of going wrong than right.

(c) RELATIONS OF TRUTH AND UNTRUTH TO
HUMAN PROGRESS.

The origin of human progress lies deep in the differences of internal motion of unlike material bodies. Each different person, or substance, by its different behaviour or property, acts differently upon us, and produces our growth, maintenance, and decay. Food and friends support us, while poison and enemies kill us. The different influences act through our feelings of pleasure and pain. Thus, through that of pleasure we are stimulated to desire more progress, and through that of pain we are compelled to avoid or diminish it. And in order to accomplish these objects we are driven to seek new knowledge. In this way, while our present information maintains our present state, scientific research evolves new knowledge for advance.

We only advance as fast as we are impelled.

The rate of general progress is probably as certain and definite as that of the earth in its orbit ; but, owing to the immense complexity of the phenomena and the limited extent of our powers, we are unable to measure it. The rate depends upon the fact that every action requires time, and upon the ability of the human body and brain to bear change. It is usually increased by truth, and decreased by untruth. It is largely regulated by the incessant conflict of the intelligent and the ignorant. While the former originate new knowledge and invent new applications, the latter prevent too rapid change. In accordance with the principle of equality of action and reaction, conflict is a part of our existence, and believers in truth and untruth constantly restrain each other. Untruth has two opposite effects upon human progress, according to its strength. Thus, if its strength is deficient, it fails to retard it; if in due amount, it produces conflict and competition ; and if in excess, it retards progress by exciting too much resistance. An excess of new truth upsets our arrangements, and it is well known that, although we cannot measure goodness, we may have " too much of a good thing."

The greatest exception to the use of untruth

is original scientific research ; this occupation stands alone as the search for truth by reliable methods. While untruth is entirely forbidden in it, unlimited faith in unproved statements is insisted upon in theological teaching. In all real scientific research dogmas and hypotheses are treated merely as questions to be tested ; its reliability is practically shown by the success of its predictions, and by the variety of ways in which the governments of civilised nations depend for advice upon scientific societies ; and its extent is partly shown by the titles of hundreds of thousands of costly researches contained in the Royal Society Catalogue, eleven volumes of which, costing more than £10,000, have already been published.

(f) CONCLUDING REMARKS.

The principles set forth in this sketch constitute a scientific basis of morality, and offer great scope for application in explaining the evolution and government of mankind. They enable us to distinguish truth from error in a multitude of complex cases, and are capable of rationally explaining "sin and evil." They form the truest philosophy and supply the safest consolation in periods of distress to

those who can comprehend the subject, because they are consistent with all known facts. Their practical applications are very interesting, because they affect all men and every act of human conduct. A fixed belief that all persons are governed by universal natural causation, and "do as they must under all the conditions and circumstances," requires us to forgive our enemies; and a full conviction that the most moral rule of conduct is "to do the greatest good" compels us to remember their actions, because knowledge is necessary for our guidance and defence. In this way, while knowledge of the great principles of science increases toleration of "sin," it also increases obedience to law and excites a due amount of conflict and progress. Even the valuable Confucian injunction to "do unto others as we would have them do unto us" is not as correct as science requires, because it does not take into consideration the fact that what we would have done unto us may not be "the greatest good" for others.

The whole of the evidence supports the common opinion that it is largely beyond our power to devise a better system of nature than that which already exists, and which causes our evolution as well as our existence.

VI.

SCIENTIFIC REMARKS ON HUMAN MISERY.

As the scientific explanation of the origin, necessity, and justification of misery is substantially similar to that of untruth, as already described in the last essay, the remarks made here respecting it are brief.

The statements contained in the foregoing essays largely explain the subject of human misery by showing that all, or nearly all, our experiences, feelings, and knowledge are caused by natural influences. Human misery and human happiness are each produced by the natural energy of our environments, either exciting or pacifying our feelings through the medium of our nervous system. Nearly all bodies, whether living or dead, act and react automatically upon each other, and produce in sentient creatures either pain or pleasure, according to circumstances, and they produce these different effects because each different body throughout

nature possesses a more or less different set of properties, and because each living creature has consciousness; they also produce somewhat different effects in different persons, because no two persons are exactly alike. Where there is no consciousness there is no misery. These facts indicate that, as long as living men and their environments retain their present properties, so long will human misery and human pleasure exist. To accurately define either misery or happiness would be very difficult. Each is, however, a state of consciousness, and the two conditions often merge into each other. Misery is a species of pain. There are multitudes of forms of misery, and the degree of it produced depends both upon the greatness of the cause and upon the sensitiveness of the sufferer. The greatest amount is often found among ignorant persons.

In the government of the universe all things are sacrificed to greater interests than their own, and man is no exception. Universal energy has no feelings, and treats all conscious beings largely as if they were inanimate substances; it produces pain and misery in two ways—first, by means of great natural catastrophes, such as epidemics, floods,

hurricanes, changes of temperature, etc.; and, second, through our extreme physical weakness and mental incompetency. Each man is carried along by the great stream of events which surround him, and his ignorance is a very large cause of his misery. In each of these cases the misery is either wholly or largely unavoidable, because the power we possess over nature is inconceivably small in comparison with that of nature over us. In the first class of cases the power of nature is so great that we cannot resist it, and in the second class we cannot prevent misery simply by an "effort of will," because the will is itself governed by natural energy. An act of will is essentially a desire to effect an object, an idea of which is already in the mind, and, similar to our other desires, is produced by our environments.

Some degree of misery is unavoidable, and the proper way to bear it is to prepare for it beforehand, and adapt ourselves to it. There are two general methods by means of which it may be diminished : first, by the discovery and diffusion of truth ; and, second, by means of consoling ideas. The first of these methods is the scientific one, and removes it permanently ; but is costly, and is only available to

those who possess suitable and sufficient knowledge. The second method is far more extensively used, because it is easy; false ideas are often more easily understood than true ones. Belief in untruth as a remedy for misery is a valuable makeshift, but is uncertain, and often leads eventually to greater misery, because false beliefs are continually liable to be destroyed by greater knowledge. The greatest cure for misery is perfect knowledge, but that we can never obtain. Even a belief in truth does not always obviate human suffering; it did not with Galileo, for instance. Why should men in many cases be punished for believing truth as well as for believing untruth?; it is essentially because the maintenance of a suitable rate of human progress is of greater importance than the feelings and pleasures of individual persons. A perfect state of bliss is impossible; and, even if there were no other reason for this, our very limited powers and enormous ignorance would often lead us into misery.

Both our misery and our happiness are closely related to our cerebral impressions, and these are a mixture of truth and untruth. Our misery depends not so much upon whether those impressions are true or false as

upon whether they console our feelings. Some of the greatest of human "crimes" and of good deeds have been produced by false ideas.

The human body and brain act and react upon each other: the brain affects the body, and the body affects the brain; and we can obtain more or less temporary relief from misery by employing this well-known natural influence. Thus, if we possess a strong belief in the efficacy of imagination or prayer, and strongly think of or desire happiness, a degree of relief from misery is sometimes obtained. This natural property of the human brain and nerves to act and react with the human body is the basis of a multitude of arrangements for alleviating distress. Thus, it is substantially the source of the relief afforded by "faith-healing," prayer, religious discourses, novel reading, and numerous amusements and influences which act largely either by pacifying the nervous system or by exciting it. The degree of complexity of the phenomena is, in many cases, so great that we are quite unable to measure or even to grasp them. The sources of error and deception, especially in psychical subjects, are so numerous and hidden that we cannot correct

the whole of them, or obtain reliable results by means of ordinary investigation. This largely explains why so little new knowledge has resulted from the twenty-four years of labour and nineteen volumes of reports of the London Psychical Society. The difficulty or impossibility of proving the truth of the ancient idea of "Telepathy" appears to arise from the same cause. In order to even partly understand such extremely difficult cases, it is necessary to view them not only in the ordinary narrow human aspect, but also in the broad scientific one, because the latter is more accurate, and serves to correct it.

The narrow and the broad views of nature are often contradictory, and confuse us. Thus, misery is "bad" in the narrow sense, because we feel it difficult to bear ; but it is "good" in the "broad" one, because it often acts as a warning of danger, and enables us to foresee and prevent greater pain and misery in the future. Misery stimulates us to acquire knowledge in order to remove and avoid it. Happiness and misery are very clearly related to each other ; thus the labour necessary to maintain life increases the pleasure of living. Having already sufficiently illustrated in the preceding

essays the advantage of pain, I need not repeat them here.

Further information on the subject of these essays is contained in a larger book, on *The Scientific Basis of Morality* (Sonnenschein ; 1899).

